UNIVERSITETET I OSLO

Department of Informatics

Technology, Organization and Learning

Email-Practices and Coordination in an Expanding Innovative Organization

Master Thesis

(60 credits)

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Abstract

The use of email has become increasingly popular during the last two decades. For some companies, email is how they communicate and coordinate their work. I have studied the Norwegian company Opera Software and the email practices of its employees, using qualitative methods and lightweight statistics. I argue that the Opera Software employees have become email professionals as a result of the large email volume. They have adapted a company-wide practice of using mailing lists, enabling them to be easily reachable through direct email while at the same time not being drowned in the constant stream of incoming email. I argue that as the company continues to expand, the practice of relying solely on email for coordination is reaching its limits. The mailing lists are segregated and fragmented into new forms, which has potentially limiting consequences for the company's ability to innovate.

Keywords: email, media richness, communication, innovative organizations, work practices, expanding organizations, email overload

Preface

This thesis is the final delivery for completing my study of *Technology, Organization and Learning* (TOOL), an interdisciplinary program, at the University of Oslo. It is the culmination of several years of study. By combining the studies of informatics, sociology and pedagogics, I have deepened my understanding of the complex interplay between technology, its users and the organization surrounding it. My thesis draws inspiration and motivation from working with information technology (IT) professionals, but it is mostly relying on sociological theories for its findings and discussions.

There are several people without whom this master thesis could not have been completed. My primary advisor, Stein Hovde, has been of great help in focusing my thesis, and has igiven me confidence and enthusiasm needed to pull through. I am also grateful to Anders Mörch, for his advice on structure and perspectives as an authority on computer-supported collaborative learning (CSCL). Opera (Software ASA) welcomed my inquiries and has been both trustful and supportive. A special thanks to my manager, Geir Pedersen, for encouraging me to pursue my studies, despite being short of staff. My fellow TOOL students have also provided feedback and functioned as discussion partners, especially in our biweekly sessions lead by professor Lars Groth. My fellow TOOL student Jan Fredrik Stoveland, whose thesis I have stolen both layout and ideas from. I am also grateful to my fellow TOOL student Jan Fredrik Stoveland, whose thesis inspired my layout and ideas. Last, but not least, I would like to thank my girlfriend Hannah Hansen for providing invaluable moral support and correcting some of my reoccurring English mistakes.

This project has been one of my most interesting undertakings, and I hope you will enjoy reading it as much as I enjoyed writing it!

Glossary

Some of the words used in this thesis are ambiguous or are given new meaning in this context. I will explain how I have chosen to use these words here.

Bug

A bug is a request for a change in a software program. It is sometimes humorously referred to as an undocumented *feature*. The bug can be of several types, such as report of a flaw or request for an enhancement. A bug report is usually associated with the bug, as are files detailing the issue. The bug is assigned to an individual, who then processes the bug, with the typical desired end state being *fixed*. Most developers at Opera has several bugs assigned to them at all times.

Build

When making a complex set of software, the compilation, linking and packaging are often handled by a build system. The end result of the process is referred to as a *build*, and is given a unique build number. This build number is especially important when reporting bugs for the software, as it helps the developers to determine what changes caused the bug.

Courtesy Copy (CC) / Blind Courtesy Copy (BCC)

Sometimes called Carbon Copy. Used to send a copy of an email to someone. If you send someone a BCC, this recipient will not be visible to the other recipients. When selecting *reply* for an email message, the reply will not be sent to those in the *CC* or *BCC* field, unless *reply all* is selected.

Email

The word *email* can be written in several different ways. Throughout this paper I will conform to the recommendation of the Oxford Dictionaries[1], which is to use the form *email*. There are

1 http://www.askoxford.com/asktheexperts/faq/aboutspelling/email (read 08.06.2009)

arguments made that using a hyphened version *e-mail* is more comprehensible, and also makes the relation to other *e-words* clearer. However, the argument goes on to say *«[...] there has been a general trend away from hyphenating words once they become established»*[2]. This position is also supported by Donald E. Knuth on his page «Email (let's drop the hyphen)[3]».

Email Clients

Email clients are the software used to read email. They come in many shapes and varieties. Common email clients include *Microsoft Outlook*, *Mozilla Thunderbird* and *Opera M2*. Web-based email clients, such as *Google Gmail* are also popular. In the email specifications the email client is often referred to as a mail user agent (MUA).

Email Lists

Threads are perhaps most common and most necessary for email list. Email lists are often referred to as the *lists* or *mailing lists*. Email lists consist of an email address and a server component, which manages this email address. The server processes all the email sent to the address, and redirects it to a set of list subscribers. The subscribers typically subscribe, unsubscribe or manage their subscription through a web interface. The most common email list server is MailMan[4].

Inbox

The word *inbox* is used somewhat ambiguously, as some authors refer to the inbox as the email client, some use it to describe a particular folder in the email client, whereas others use it to describe unread email. My use of the word *inbox* is to describe the folder for incoming messages in the email client.

Threads

Emails carry identifiers which allow email clients to organize them in threads. Similarly to how online forums or Internet newsgroups work, most email clients indent replies in a thread, as is shown in Figure 1 below. The emails forms a hierarchy of responses, which makes the structure of the conversation easier to grasp.

2 http://alt-usage-english.org/excerpts/fxhowdoy.html (read 08.06.2009)

3 http://www-cs-staff.stanford.edu/~knuth/email.html (read 08.06.2009)

4 http://www.gnu.org/software/mailman (read 10.05.2009)

Figure 1. Email threads in Opera M2.

In Figure 1 I have shown how threads appear in the latest version of Opera M2 (10a), the company email client. The arrow on the initial message indicates that the entire thread can be collapsed - and thereby hiding the entire conversation from view.

Contents

Chapter 1

Background

In this chapter I will detail my initial motivation for undertaking this project, give some background on Opera as a company, and my role in Opera. This will be followed by some history and technical information about email. I then proceed to present my research questions, and at the end of the chapter I will lay out the structure of the rest of the thesis.

Motivation

In many of today's knowledge-intensive firms, email is the artifact that constitutes interplay between knowledge workers. Email serves the functions of many previous technologies and is the primary tool both in conducting day-to-day activities and managing long-term projects. While working at Opera Software I became increasingly aware of the critical role email played in this organization. At the same time, I realized that Opera, despite having unique properties, was not significantly different from other technology-based companies. By working at Opera from 2005 to 2008 I experienced first hand the impact of company growth, as the number of employees more than doubled during this period. Plans for structural reorganization were put into action, to keep the organization manageable and productive as it grew. However, the email system was seemingly just expected to adapt on its own. Already when I started in 2005, I heard complaints about the large quantity of email being received - most of it on company wide mailing lists. Yet somehow the system adapted to this growth. The traffic on the open lists did not grow as much as could be expected, and the employees did not spend their entire workday in their inboxes.

This was somewhat surprising. Where did all the email go? What got lost? What happened to the questions that no longer were asked on these lists, were they answered elsewhere? Maybe the mailing lists themselves changed character? I knew from my previous studies that organizations of this nature were dependent upon effective communication to innovate. How could Opera use the same way of communication and coordination without the employees being overwhelmed? These

questions intrigued me profoundly and inspired me to start this journey to find out more.

Opera The Company

Opera is unique in the Norwegian context. It started as a spin-off from a project at the research and development (R&D) department of Norwegian telecommunications giant Telenor. They released a web browser, which proved fairly popular. Opera has been one of the driving forces behind the World Wide Web Consortium (W3C), pushing for broad and open standards shared by all browser vendors. Opera has shifted its focus from the desktop browser, and now develops the Opera Browser for several platforms. As mobile phones got more powerful, Opera expanded into the mobile browser market, and increased its efforts in this area after making the desktop browser free.

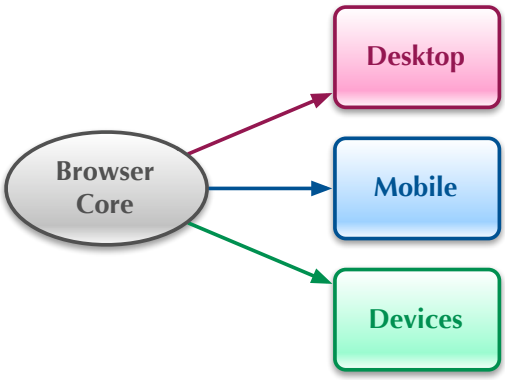

Figure 2. Opera product lines.

Opera now has 3 main product lines, for desktop computers, mobile phones, and various devices. They share a common browser core. In addition Opera provides services, including an online community [5] and a widget (web application) download site [6]. The company now has offices in the common locations, such as the US and Asia, but also in other low-cost countries such as eastern Europe and parts of Asia. Opera recently expanded in Poland. All in all, there are employees from over 100 nationalities, many of them working at the Oslo office.

5 http://my.opera.com (read 12.05.2009)

6 http://widgets.opera.com (read 12.05.2009)

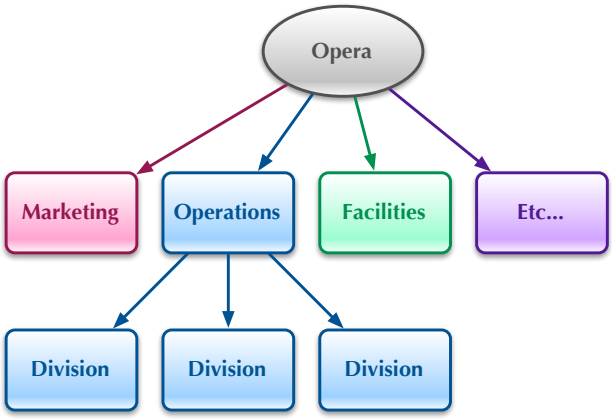

Figure 3. Rough organizational chart.

The organization is fairly standard for technology-based companies. The main part of Opera is the engineering unit, which again is spilt into various departments. This is where the *core activity* of developing software takes place, and where most of my interview subjects work.

My Team, My Role

As previously mentioned, I have worked at Opera from 2005 to 2008, in the Web Applications department. Web Applications was a black sheep of sorts - we worked on immature technologies and were liaising with various teams on a per-project basis. As the technology matured, work shifted from mainly research-driven into more delivery-based projects. The aim for the team has been to create applications and frameworks that execute within the browser environment - preferably on the Opera Core, using Advanced JavaScript And XML (AJAX) technologies. The team grew explosively, from around ten members in 2005, to over 20 at the end of 2008. During 2006 a division of the team was formed in the Opera India office. I worked as a graphics designer, often on projects for other divisions within Opera.

Brief History Of Email

The historical roots of email run deeper than most people would think — email was not invented during the 1990s, it has been around for quite some time. It was one of the first services to be used on the Internet.

> «The current version of the standard for e-mail dates back to 1982. That version developed through revisions spanning three years. A separate standard specifying the format of the e-mail message was launched in 1982 together with the protocol itself. An earlier version of formats for e-mail goes back to 1977.» (Hanseth, Monteiro et al. 1996)

At first it was used by enthusiasts, universities and the military. Some early studies gave reports

about the shortcomings, such as lack of features in the email-clients or hassle connecting to the Internet. Even so, the overall reception of the email system was positive. Hersh (1982) studied early email adaption, and found it to be very successful in business life.

> «Overall, this corporate-wide electronic mail system has been very successful. Where the requirements of the user are met by the features of the system, the reaction is most positive. Where there are discrepancies, users appear more willing to bend the use of the system, rather than their own behavior.» (Hersh, 1982)

After initial slow adoption, economics of scale rapidly increased the adoption rate. The more Internet users with an email account, the more desirable it became to have one, in order to contact those already online. Today, it is common to have at least one personal and one work email account. Several independent companies offer free email services, and most Internet Service Providers (ISP) offer email accounts as part of their subscription services. Email has matured since it was initially conceived during the mid-sixties, but it is built upon the standard from 1982, specified in RFC822 [7]

Sending Email - A Brief Technical Explanation

To facilitate sending an email from A to B, several events are taking place behind the scenes. The mail user agent (MUA) hands the message to a mail transfer agent (MTA). The MTA is typically run by the organization, which owns the mail server, or an Internet service provider (ISP). This takes place using the Simple Mail Transfer Protocol, SMTP. The MTA then examines the email address given; in order to decide which domain it should be sent to, using a Domain Name Server (DNS) lookup. It is then shipped to the Mail Exchange (MX) servers for the correct domain, which finally delivers the message to the recipient [8]. To use the system, a user will need to know his email address, user name, password, and mail server. The organization or ISP commonly configures these settings in advance.

The email address consists of two main parts, separated by the @ sign. In the case of the email address *user@domain.com*, *domain.com* would help the MTA find the right location, whereas the *user* part is used by the MX server to determine which inbox it should go to. Usage of the @ sign started with Ray Tomlinson in 1971, and has been a standard ever since[9]. There are two common protocols used for retrieving email; the Post-Office-Protocol (POP) and the Internet Message Access Protocol (IMAP). In standard configurations, POP works by downloading all inbox content to the MUA when fetching. IMAP leaves the email on the server, and allows users to access the

7 http://tools.ietf.org/rfc/rfc822.txt (read 10.05.2009)

8 http://en.wikipedia.org/wiki/Email#Workings (read 10.05.2009)

9 http://en.wikipedia.org/wiki/Ray_Tomlinson (read 10.05.2009)

same email account from many computers[10]. The price paid for the flexibility offered by IMAP is increased server load, especially for bandwidth and data storage.

Research Questions

To figure out how email was handled at Opera, I needed a plan. The initial plan was to simply enter the company with open eyes, and get data on email usage any way possible. As I learned more, my questions developed and changed. I have one major question, and three sub-questions which will help me answer the major question. These questions have been moving targets to a larger extent than I had originally anticipated.

1. How is email used within Opera Software?

My main goal is to identify how email is used within Opera Software. To explore this question fully, I have devised a set of sub-questions, which will help me answer this overarching one.

1.1. To what extent does Opera Software qualify as an innovative organization?

Innovative is a label most companies do not mind getting. I will look at how Opera compare to definitions of innovative organizations, and describe what an innovative organization looks like; what are its characteristics and how work is coordinated within it, before finally focusing on the cultural aspects of Opera that may make it different from other similar organizations.

1.2. What is the nature of the practices that generate email?

From past affiliation I know there is a large volume of email at Opera. I hope to provide information about which practices are in place at Opera that contribute to the email volume. What are the reasons for preferring email to other communication channels?

1.3. What strategies do they employ to deal with volume?

As the volume as grown, it is interesting to see how the Opera employees adapt to this volume. I will look at the strategies they have developed to manage the large amount of email effectively.

1.4. What happens to email communication as the company grows?

Opera has experienced solid growth during the last decade, and this must have had an impact on the way they coordinate. I will look at how well email as a coordination system scale, and see what happens to the innovative company as it ages.

10 http://www.imap.org/about/whatisIMAP.html (read 10.05.2009)

Thesis Outline

After the background chapter, which is rapidly approaching its completion, I will present what I deem to be relevant theories. This will be followed by a description of my research methods, four chapters discussing my findings and finally a conclusion.

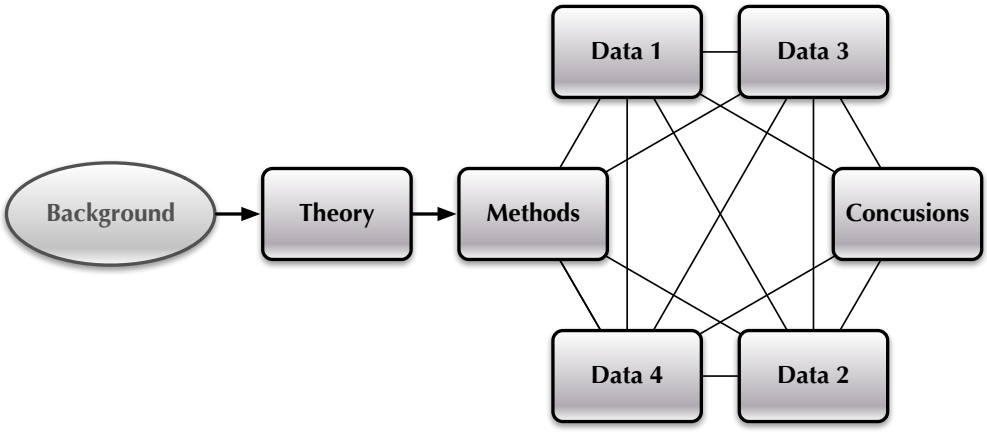

Figure 4. Structure of the thesis.

Initially I intended on a more structured approach, where I would separate my data from the discussion and analysis. However, my desire in this thesis is to be able to tell a story, and I believe that by letting my data act as a guide, the story will be more interesting to the reader. It also represents the interconnected nature of the data. I have chosen to organize my data chapters by topics that map to my research questions, but the data material could have been connected in numerous other ways to tell the story differently.

Chapter 2

Theoretical Perspectives

In this chapter I will review relevant literature and research related to my project. I will discuss theory pertaining to different aspects of my study. I establish the nature of innovative organizations, and how coordination in such organizations take place. I then look at media richness theory, concerning how various media have different properties and a different level of richness. Lastly I also touch upon some practically oriented theories concerning email.

Innovative Organizations

During the last decades there has been a shift in modern working life, and an emergence of a whole new industry, the computer industry. What was once an exotic hobby for the few interested is now how a fair share of the population earns their keep. In this age, the *information age*, a new type of companies has emerged. Instead of the previously common mass-producing, where the goal was to optimize duplication of products as much as possible, these new companies have a radically different goal. They create products which are more expensive to initially develop than they are to mass-produce. This has consequences for the organizational structure.

> «[...] offer to the market the use of fairly sophisticated knowledge or knowledge-based products. The products may be plans, prototypes, blueprints or mass-produced products where the R&D cost outweighs manufacturing expenditure.» (Alvesson 2004:17)

Instead of spending money trying to make duplication as affordable as possible - money is now spent in order to make innovation as affordable as possible. It is a world where the physical objects are less important, and ideas are valued more than tangible goods.

"One Apple can feed a man, but an idea can feed the world." (Alex Tabarrok[11])

It comes as little surprise that these knowledge-intensive firms (KIFs) are found in software development, where the cost of duplication and distribution is low. Software development, on the other hand is complicated, labour-intensive and expensive. Software developers usually have academic degrees, which in part explains the high development costs. Alvesson (2004) claims that it is not the education that matters, but rather the cognitive abilities needed to get a degree that makes up the difference:

> «The significance of education is not self-evident. There are other routes to jobs in KIFs than a university degree, but there is a strong tendency for this type of organization to employ a large number of graduates. Formal education is seen as very useful facilitating theoretical and analytical abilities essential to such organizations. Education may also be seen as something of an indicator of competence and as legitimizing expert status and high fees. Symbolic work - using ideas and concepts is crucial, while the transformation of material objects or the carrying out of tangible services are typically not very significant. Theory-guided cognitive activity is important - or at least makes a difference in more situations and for more people in a KIF than in other organizations.» (Alvesson 2004:17-18)

The workers in these organizations, knowledge workers, are there because they have the ability to transform ideas into working solutions. While being a skilled programmer, who makes few mistakes and codes properly, is appreciated; being able to communicate and implement good ideas is just as important.

Knowledge-intensive firms are not necessarily equally knowledge-intensive in all parts of the organization. It is possible to have a wildly innovative marketing or R&D department, without this reflecting the rest of the organization. It is also not uncommon for organizations to overplay their knowledge-intensiveness, striving to label themselves as innovators.

> «Sometimes organizations are more than willing to emphasize or exaggerate their «knowledge-intensiveness». Pharmaceutical companies, for example, prefer to stress their science and R&D departments rather than their frequently very large sales and marketing units and costs.» (Alvesson 2004:18)

In order to make the KIF-label not too easily obtained, Alvesson adds that the knowledge-intensive part of business must be "substantial" and of significant size.

11 http://www.ted.com/index.php/talks/alex_tabarrok_foresees_economic_growth.html (read 13.05.2009)

Organizational Configuration

One way to describe organizational structure, is to see the structures as various configurations, which organizations are drawn to by self-reinforcing processes. The primary driving forces can be external, in the sense that the environment in which the organization exists, favors certain configurations. It can also be the result of attempts at streamlining the organization. The configurations are constructed *ideal types*. They are theoretical creations - most organizations in the wild will not strictly adhere to these configurations.

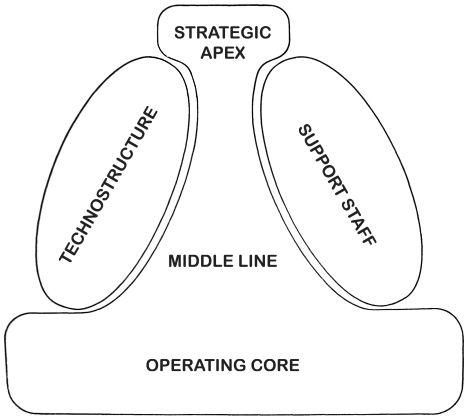

Figure 5. The five basic parts of the organization (Mintzberg 1983:11)

In his famous book: «Structure in Fives», Mintzberg (1983) argued that all organizations leaned towards one of the five default configurations. His list has later been expanded to include two additional configurations, bringing the total number up to seven. The seven are: *«the entrepreneurial organization»*, *«the machine organization»*, *«the diversified organization»*, *«the professional bureaucracy», «the adhocracy»*, *«the missionary organization»* and *«the political organization»*. Of particular interest is the adhocracy, which fits particularly well with a company doing software development.

> «Sophisticated innovation requires a fifth and very different configuration, one that is able to fuse experts drawn from different disciplines into smoothly functional ad hoc project teams.» (Mintzberg 1983:254)

This is exactly what Opera does by combining software engineers, interaction designers and graphic designers to work on small and large project teams. Like Mintzberg predicts, experts are often grouped by function or by which market they serve. Yet, in their day-to-day activities, the employees are often working on various projects across the organization. There is a matrix of teams and projects across the entire organization (Mintzberg 1983:255).

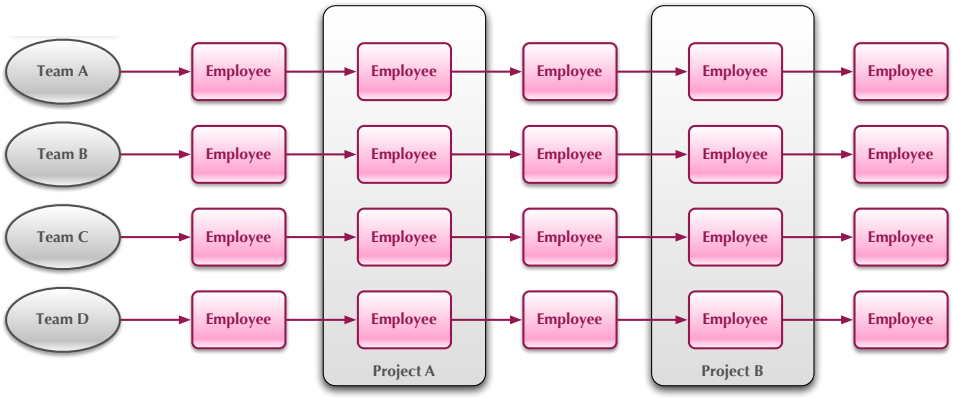

Figure 6. Matrix organization.

Matrix organizations are complex by nature, and in order to coordinate *«[…] managers abound in the Adhocracy - functional managers, integrating managers, project managers.»* (Mintzberg 1983:256). With so many managers, they each control only a limited part of the organization. And their managerial role is often not direct supervision of their employees, but rather to help them coordinate with other parts of the organization. Mintzberg also notes that many of the managers are experts themselves, and work alongside the other project members.

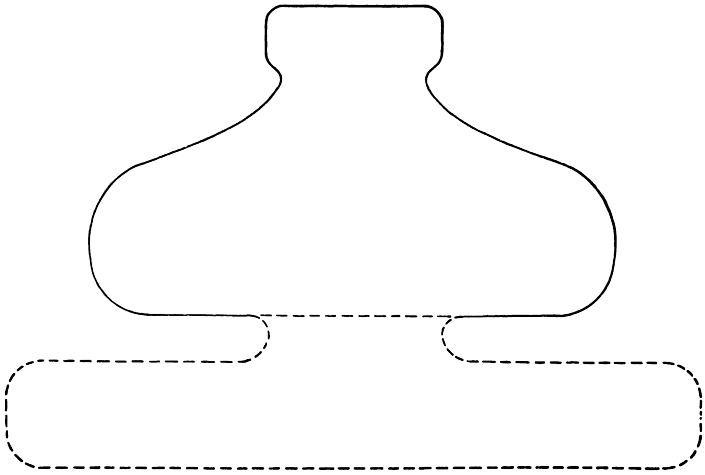

Figure 7. The adhocracy (Mintzberg 1983:262).

When modifying his famous illustration of organizational configurations to fit the adhocracy, Mintzberg describes the result as *«[…] one amorphous mass in the middle»* (Mintzberg 1983:262). He divides his description of the adhocracy into two forms; the operating adhocracy and the administrative adhocracy. In Figure 7 above, the separation of the operating core and the rest of the organization in the administrative adhocracy is marked with a dotted border around it. I would place Opera as an operating adhocracy, where the work at the operator level is the core activity of the organization. Opera does innovate and solve problems directly on behalf of its clients (Alvesson 2004), and there is no clear distinction between the operating and administrative components of Opera. The creative nature of adhocracies is not without cost. The fluidity is too much for some people to handle, and according to Mintzberg; *«Conflict and aggressiveness are necessary*

elements in the Adhocracy; management's job is to channel them toward productive ends» (Mintzberg 1983:277). This *«tomorrow's organizational structure»* (Mintzberg 1983:275) is not only a creative place to work, but can also be a taxing environment on the human psyche, with its sustaining conflicts. Another aspect of adhocracies is their inefficiency. The reason for this is that adhocracies need to solve complex tasks - which are often with no known solution. They therefore work in ways that make them bad at handling routine work. This is related to communication, as adhocracies are akin to bee hives; constantly buzzing.

> «The root of its inefficiency is the Adhocracy's high cost of communication. People talk a lot in these structures; that is how they combine their knowledge to develop new ideas. But that takes time, a great deal.» (Mintzberg 1983:277)

According to Mintzberg they «talk a lot», in adhocracies . He does not explicitly say «email a lot», but it could be interpreted as a reference to the same process. There are many who need and want to have their say in a decision-making process. It is complicated, and time-consuming process, and reaching a conclusion may not be possible. However, due to the widespread participation in the decision-making process, once the conclusion is reached it typically faces little resistance during implementation (Mintzberg 1983).

Coordination Mechanisms

Within organizations there are several ways to coordinate work. According to Mintzberg (1983), this can happen in one of six ways: *Direct supervision*, *mutual adjustment* or through four forms of *standardization* (Mintzberg 1983). There is a correlation between the coordinating mechanism and the organizational configuration.

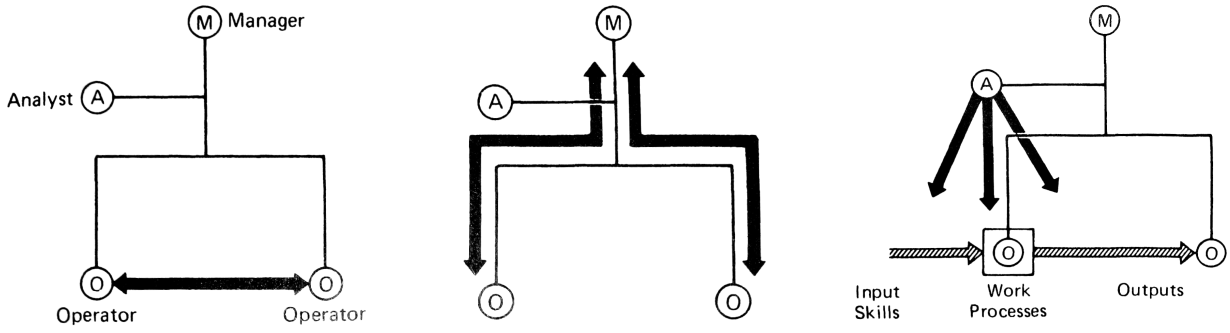

Figure 8. The five [six] coordinating mechanisms. (Mintzberg 1983:5)

As the simplest form of coordination, mutual adjustment is used for coordination between operators, without the influence of managers or technocratic staff. It works well in simple organizations, but it is also used for the extremely complex tasks, where it is imperative that all operators are on the same page.

> «Because it is such a simple coordinating mechanism, mutual adjustment is naturally used in the very simplest of organizations - for example by the two people in a canoe or a few in a pottery studio. Paradoxically, it is also used in the most complicated. Consider the organization charged with putting a man on the moon for the first time. Such an activity requires an incredibly elaborate division of labor, with thousands of specialists doing all kinds of specific jobs. But at the outset, no one can be sure exactly what needs to be done. That knowledge develops as the work unfolds. So in the final analysis, despite the use of other coordinating mechanisms, the success of the undertaking depends on primarily on the ability of the specialists to adapt to each other along their uncharted route, not altogether unlike the two people in a canoe.» (Mintzberg, 1983:4)

Mintzberg describes knowledge creation, by saying «That knowledge develops as the work unfolds». So in organizations where knowledge creation is a core activity, mutual adjustment is the natural coordinating mechanism. Direct supervision is the most common form of coordination in small organizations. A manager oversees and coordinates the work between the operators.

> «As and organization outgrows its simplest state - more than five or six people at work in a pottery studio, fifteen people paddling a war canoe - it tends to turn to a second coordinating mechanism. Direct supervision achieves coordination by having one person take responsibility for the work of others, issuing instructions to them and monitoring them [...]» (Mintzberg, 1983:4)

Standardization as a coordinating mechanism takes four forms. It can be either a standardization of the operators skills, the work processes, the outputs they create or of the workers' norms. Standardization is often the solution when the organization outgrows the other coordinating mechanisms.

> «Work can also be coordinated without mutual adjustment or direct supervision. It can be standardized. Coordination is achieved on the drawing board, so to speak, before the work is undertaken.» Mintzberg, 1983:5)

These amount to a total of five coordination mechanisms, and as we will see, they roughly correspond to the five organizational structures given by Mintzberg in «Structure in Fives». They describe various steps in the life span of an organization.

> «As organizational work becomes more complicated, the favored means of coordination seems to shift from mutual adjustment to direct supervision to standardization, preferably of work processes, otherwise of outputs, or else of skills, finally reverting back to mutual adjustment.» (Mintzberg, 1983:7)

By looking at it in this way, it is possible to see the different ways of coordinating as evolutionary steps. This could mean that an organization configured as an adhocracy will be forced to shift into another form, should the complexity increase.

Organizational Changes

Previously I have described adhocracies as creative and sometimes even bordering on hostile environments. This inner turmoil results are reflected in the organizational structure itself. According to Mintzberg, *«All kinds of forces drives the Adhocracy to bureaucratize itself as it ages»* (Mintzberg, 1983:272). Youth is therefore seen as a condition of the adhocracy. The organizations then either dissolve or change form as they grow. Various parts of the organization are inclined to pull the organizational structure in certain directions. The leaders will want to centralize, where the managers will want to balkanize. The technocrats will try to standardize, the support staff will aim for closer collaboration, and the operators will want to professionalize.

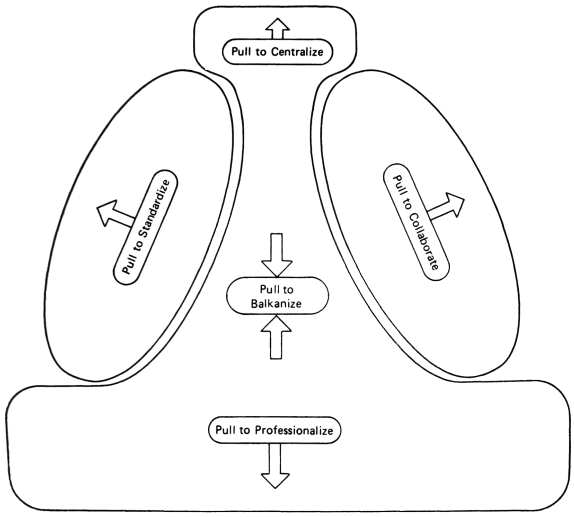

Figure 9. Five pulls on the organization (Mintzberg 1983:154).

The strongest pull comes from the part of the organization which has the most power, and in the case of the adhocracy, that part is the operating core, which pulls to professionalize. Organizational age is an important factor, and therefore success, as unsuccessful small companies do not last long in a competitive environment. *«Success [...] encourage a metamorphosis in the Operating Adhocracy, driving it to more stable conditions and more bureaucratic structure» (Mintzberg 1983:272).* As Opera ages, a shift towards something more stable then the adhocracy is thus inevitable, if Mintzbergs' assessments are correct.

Hierarchical Vs Network Organizations

During the 1990s, while the Internet was still emerging, some believed that the new network infrastructure would drastically change the way we work and coordinate. Jacob Palme shares this

vision, arguing that one of the benefits of email is that it allows information to flow freely, even in previously hierarchical organizations.

> «[...] it only took a few days from the idea to the formation of a group of experts, with members from different parts of the company, until the development of the product. If the company had used traditional communication patterns, several months would have passed before the new idea had filtered up and down through the organization and caused such a geographically distributed group of experts to be formed.» (Palme 1995:11)

This is an example of the (over-)optimism that surrounded the new communication technologies such as email and the world wide web. Being able to communicate more effectively has not yet changed organizational structures in the way envisioned by Palme. There appear to be other forces at play, limiting the interaction between organizational members.

Social Aspects Of Email

Communication is often described as a sender sending content to a receiver. In this aspect, email serves as a container of content. As such, it incurs some restrictions on the type of content and how it can be delivered.

The Social Affordances Of Email

Wellman realized that *«there were a number of ways in which e-mail was preferable to face-to-face communication»* (Wellman, 1999:1). He divided them into three main categories.

The first one is focus. Email allows you to better prepare statements, and gives you more control. It is also less emotionally taxing than face-to-face communication. The second affordance is privacy and control. Wellman argues that conversations can be kept private, and a complete of your conversation will automatically be saved. The last point is that of speed and ease. Reading is faster than listening, and typing can be faster than talking. It is easier to reach the other party, as the email will wait until they have time to read it. It is easy to include attachments or hyperlinks as well. He wrote this as a rebuttal to the notion that email is always an inferior substitute to face-to-face communication. In the opinion of Wellman, email deserves to be treated *«[...] not just a lame version of face-to-face communication»* (Wellman 1999:1). It is a unique medium with its own particular affordances.

~~Social~~ Spam

When used to describe email, spam typically means mass sending of unsolicited messages. Most long-time email users have a passionate relationship with spam — they passionately hate it. To combat spam, most email clients are equipped with adaptive filters, searching incoming email for

words that can classify the message as spam. The user then can mark additional messages as spam, or identify the incorrectly marked messages. Messages identified as spam are often given restrictions, to prevent the email from contacting remote servers (calling home) when read. Spam is also fought at the server level, in which the email servers use block lists and filters to help each other identify and stop spam.

Another type of spam is *social spam*, which differs from the traditional spam in two ways: It is typically sent from someone you know, and it contains something that you might find of interest. The social spam is not detected by spam filters, because it is from someone you trust, and it does not match the characteristics of ordinary spam. What counts as social spam is highly subjective - there is commonly a difference of opinion between the sender and the receiver.

It Stops Me From Falling Behind

A parallel could be drawn to the work of English-Lueck, who studied family and work cultures in Silicon Valley in the midst of the 1990s. The valley was subject to rapid changes and there was pressure to deliver results. This resulted in what English-Lueck describes as *«colonization of home time by work»*. One of the interviewees describe how he hoped that he would get ahead by working a bit at home:

> «But I saw, or hoped, that working at home would allow me to get even more done and give me an advantage at work. And then I thought that if I need an occasional afternoon off, it would be okay because I would be ahead. Of course, that was naive. Everybody works at home and now it is a standard. Working at home doesn't let me get ahead, it stops me from falling behind».[12]

After a while he see that it does not work - because everyone else was also working at home. So in order to avoid the working life invading the private sphere, these pushes must be resisted. As soon as something becomes a de-facto standard, doing it will not help you get ahead - it will simply prevent you from falling behind.

No Filers, Frequent Filers And Spring Cleaners

Sidner and Whittaker (1996) performed a study of Lotus NotesMail users in which they interviewed the users concerning their email behaviors and experiences, and reviewed the contents of their inboxes. Their study carries similarities to the one conducted for this thesis, but with a different selection of interviewees, weighted towards higher-level managers.

> «The 20 study participants were office workers representing four major job types: 4 high level managers, i.e. people who had other managers reporting to them; 5 first level managers; 9 professional workers with no management responsibility, and 2 administrative assistants.» (Sidner and Whittaker 1996:277)

[12] http://heim.ifi.uio.no/~almira/in-sats/family.html (read 10.05.2009)

Based on their findings, they described three strategies for managing their inboxes. They branded them as *«no-filers»*, *«frequent filers»* and *«spring cleaners»*. A no-filer would be a person who rarely used folders, and left everything in their inbox. The only way for a no-filer to locate his email was through searching:

> «No filers: made no current use of folders (mean 11.33), but relied on full-text search to find information. Their folders were historic remnants from when two of the no-filers still files. [...] More significantly, over half of their inbox was old information that arrived more than 3 months ago.» (Sidner and Whittaker 1996:280)

So the no-filers did not start out as no-filers, but rather ended up that way as they eventually gave up on managing their email inbox and their folders. In addition, half of their information was more than three months old. The second category described by Sidner and Whittaker were the «frequent filers». This group would keep their inboxes small and organized.

> «*Frequent filers:* [...] made daily passes through their inbox filing or deleting its contents. Their inboxes were relatively small [...]. In addition, the inbox consisted almost exclusively of new items [...]. They made frequent use of folders [...].» (Sidner and Whittaker 1996:280)

The frequent filers are in stark contrast to the no-filer, as they daily ensure their email is sorted and organized as it should be. Half of the those Sidner and Whittaker found to be frequent filers were in fact administrative assistants. The last category described are the «spring cleaners». These are basically no-filers with periodic clean-up sessions of their inboxes.

> «*Spring cleaners:* dealt with the overloaded nature of their inboxes by intermittent *clean-ups* - normally every 1-3 months. They made extensive use of folders, even though this was often unsuccessful [...]. Over 40% of their inbox messages were more than 3 months old. Four of the seven *spring cleaners* were managers.» (Sidner and Whittaker 1996:280)

Sidner and Whittaker notes that managers are more prone to be spring cleaners than any other group.

Overloaded Inboxes

Programmatically speaking, the term «method overloading» typically means to let one function name utilize several methods, depending on how the method is called. Similarly, email clients can be made to function as different things, depending on how they are used. The classical email client makes certain assumptions about how it is to be used, as it is designed around certain expected usage patterns. Sidner and Whittaker (1996) call the typical usage pattern the «one touch model», and describe how it should ideally function:

> «A simple *one-touch* model of email might assume: incoming messages that are *informational*, i.e. those not requiring a response, are read, and then either deleted or filed, depending on their relevance. Incoming messages that form part of a *correspondence* (i.e. requiring a response), are answered and then either deleted or filed. According to the *one-touch* model, information can therefore be in two possible states: unread and filed.» (Sidner and Whittaker 1996:277)

Having email only exist in these as unread or filed is optimistic, as it does not account for the cases in which you may not be able to respond to right away. According to Sidner and Whittaker the designated use pattern - the «one touch model» - is the wrong one.

> «Our quantitative data show the *one-touch* model is patently incorrect. [...] what is happening and why is the inbox so full? It turns out that there are two related reasons for this: (a) the inbox operates as a *task manager*, where people are *reminded* of current tasks, and where people can keep information relevant to those tasks *accessible*; (b) people find it hard to *file* information to remove it from their inbox, both because filing it into folders is difficult and there may also be few benefits to creating folders.» (Sidner and Whittaker 1996:277-278)

Instead they identify two additional usage patterns; the first one being the inbox as «task manager» and the second one that the users find filing valuable. Sidner and Whittaker find that the inbox is used as a way to track work in progress, serving as a set of reminders of what needs to be done. The users are bending the email system in order to accomplish what they need to do, instead of filing and deleting as would be expected by the system developers.

> «What unifies these is that they are all *incomplete*, and the usual strategy is to leave them in the inbox to serve as *reminders* that some further action is required. They are not normally filed away, because filing would mean that they are no longer visible whenever new email is read or the inbox searched.» (Sidner and Whittaker 1996:279)

It is reasonable to say that email clients have failed to fully support the usage patterns which have emerged as email usage has become more widespread. Sidner and Whittaker (1996) conducted their study on users of Lotus NotesMail. This is just one of the many email clients in existence. However, the basic functionality is usually similar, so the usage patterns indicated in the above numbered list should be generally applicable, and not just limited to NotesMail.

The Keepers And The Cleaners

Based on the findings from Sidner and Whittaker, Gwizdka conducted a study in which 24 participants were given a questionnaire as well as cognitive tests. Gwizdka found that two distinct patterns were emerging. They were named «keepers» and «cleaners». The «cleaners» tended to batch their email together, and did not use their email for other tasks. The «keepers» constantly read new email, and used their email client to stay on top of events and tasks.

Email Habit Variables	The Cleaners (Cluster 1)	The Keepers (Cluster 2)
When email is read	read email at specific times	read email all the time
Email interrupts other tasks	email does NOT interrupt other tasks	email interrupts other tasks
Uses search in email	do NOT search in email	search in email
Keeps events in email	do NOT keep events	keep events
Keeps to-do's in email	do NOT' keep to-do's	keep to-do's
Emails self-reminders	send self-reminding email messages	do NOT send self-reminding email messages

Table 1. Description of differences between cluster members (Gwizdka, 2004:4)

In order to determine what caused this difference, a T-test was conducted. The two factors found to influence which group someone would belong to were experience using an email client, and flexibility of closure.

> «People grouped in cluster 1 tended to have less email experience and were low on flexibility of closure, while people grouped in cluster 2 tended to have more email experience and were high on flexibility of closure.» (Gwizdka, 2004:4)

The people in group 2 were found to be more flexible on closure, and also more experienced with the email client. I find it strange that good understanding of the email client would lead to a less structured inbox. It would be easy to assume that skilled email client users would be better adept at organizing things properly. The determining factor therefore seems to be the need for closure, as those who have high flexibility of closure do not need to organize their inbox content to the same extent as others.

Media Richness Theory

Media richness theory (MRT), also sometimes referred to as information richness theory, describes how properties of communication channels affect the communication itself. The richer the media; the more flexible the communication channel. Media richness ranges from high to low richness, with face-to-face communication being the *richest* and to bulk mail being the *poorest*. With rich media, new understandings of the information can develop during its delivery.

> Information richness is defined as the ability of information to change understanding within a time interval. Communication transactions that can overcome different frames of reference or clarify ambiguous issues to change understanding in a timely manner

> are considered rich. Communications that require a long time to enable understanding or that cannot overcome different perspectives are lower in richness. In a sense, richness pertains to the learning capacity of a communication. (Ngwenyama et al. 1997:146, quoting Daft and Lengel 1986:560)

The level of richness is a measure of the learning capacity of the communication itself. When communicating in a channel with lower richness, the learning potential is much lower. This results in that error-correction is much more difficult, and thereby increase the problem of misunderstandings. Based on this, Daft (et al. 1987) create a scale, on which various communication forms are placed.

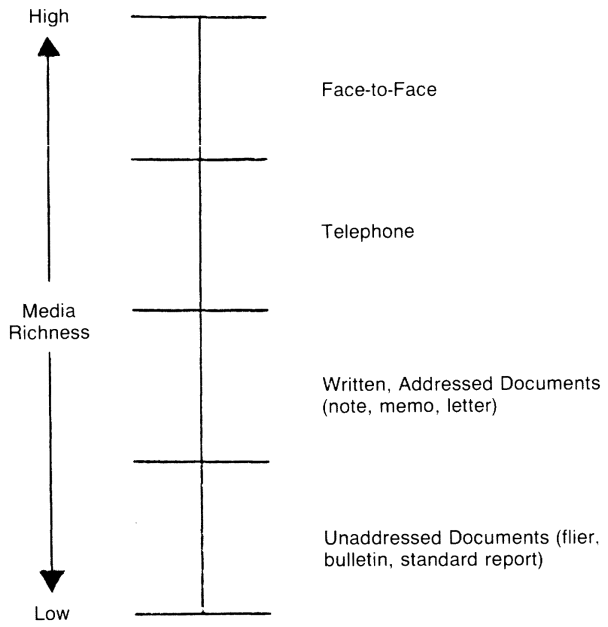

Figure 10. Media richness scale

From Figure 10 it is clear that face-to-face communication is at the very top, as it is the standard medium against which all other interactions are measured. In terms of media richness, there is no better way than to meet with someone directly.

> «Face-to-face is considered the richest communication medium. Face-to-face communication allows rapid mutual feedback. A message can be adjusted, clarified, and reinterpreted instantly. Other forms of communication, such as memos do not allow for timely adjustments and refocusing of the message.» (Daft et al. 1987:358-359).

When meeting someone face to face, there are numerous ways to adjust or clarify ones message; by combining what is said with how it is said as well as overall body language you get a wide array of feedback on how the recipient thinks about your message. Other media do not allow for the same level of adjustment and refocusing. Where would email fit in on this scale? Daft uses four criteria to decide the richness of a given media. These are *support for instant feedback, multiple social cues*,

language variety and *personal focus*. Face-to-face interaction would score high on all these four. Email, on the other hand, has asynchronous feedback, virtually no social cues, but a bit of persona focus and allows for some language variety. Email is never unaddressed, though it may not be sent directly to the recipient. I would place *direct emails* in the second lowest tier, along with notes, memos and letters. *Bulk email*, sent to lists or with the recipient in the CC field I would rank lower, but not at the bottom of the scale. Email is low on richness, but the target audience can be somewhat defined and it allows for language variety - provided the sender and receiver understand the languages.

Task Ambiguity

Media richness is often mentioned along with equivocality, or task ambiguity. Ambiguous tasks requires the ambiguity to be cleared up before the task can be completed. In order to clear these up effectively, MRT states that rich communication channels are needed.

> «For highly equivocal tasks, communication channels with higher information richness are often necessary to better ensure the transfer of information to the message receiver in a way that reduces potential conflicting interpretations or misunderstandings.» (Lo and Lie, 2008:147)

Choosing an adequately rich channel for the communication is necessary. Knowing what channel is needed to tackle the task at hand is important in terms of performance. Daft (et al. 1987) studied the relationship between the selection of media by managers and measured their performance.

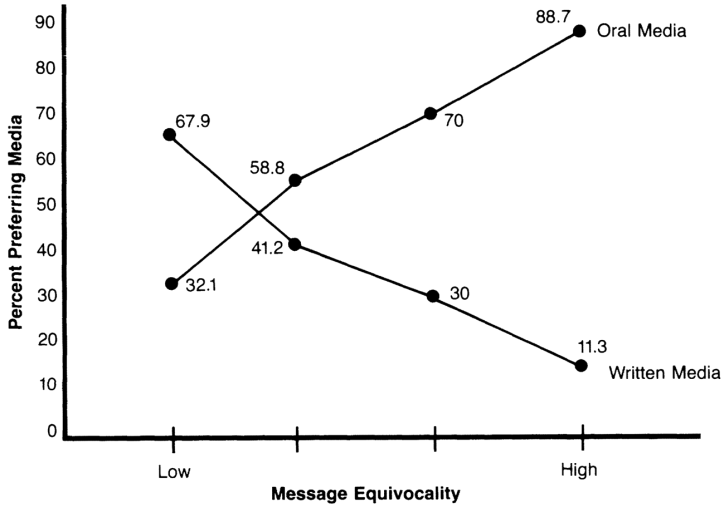

Figure 11. Media selection and manager performance (Daft et al. 1987:363).

Daft (et al. 1987) found that higher message equivocality correlated with a shift towards richer media. Furthermore, managers who were good at matching the media richness of the communication channel to the equivocality of the task, performed better than their peers (Daft et al. 1987:363).

Lo and Lie examined a potential difference between long- and short-distance communication scenarios. They found that in long-distance scenarios, low equivocal tasks were communicated with poorer communication channels to trusted individuals. In short-distance communication scenarios there were no significant difference in media choice due to trust.

> «[...] when a task has a low degree of equivocality, participants tend to choose a communication technology tool with a lesser degree of information richness for communicating with trusted parties, but select a much higher level of information richness for distrusted communicating parties. However, for discussing highly equivocal tasks, the trustworthiness of the communicating party has no effect on the level of information richness of the chosen tool.» (Lo and Lie, 2008:147)

Nevertheless, for highly equivocal tasks rich media were preferred, even with those considered trustworthy. So for important but ambiguous tasks, rich media is preferred, but for less ambiguous tasks, trusted parties can be coordinated with less rich media. As such, there is a relationship between *trust* and *media richness* - using poorer media can be seen as a sign of trust.

Introverts' Media Choice

Hertel (et al. 2008) has discovered a possible connection between shy people (introverts) and choice of media. He finds that introverts exhibit a tendency to prefer poorer media than do others. He further suggests that choosing the appropriate media can make the communication partner feel more comfortable.

> «The results of a questionnaire study (N = 228) on preferences for communication media with varying levels of media richness (face-to-face conversation; e-mail) revealed extraversion and neuroticism as significant predictors of media preferences. Moreover, these effects were mediated by the traits' motivational manifestations in social situations (i.e., social skills, social anxiety)». (Hertel et al. 2008:2)

Email is preferred by those who desire less social interaction. The stereotype of the IT-worker is often that of an introvert, and Hertel's findings could in part explain the preference for email in such groups. Hertel notes that if the content is critical, it might be wise to match the media used to the recipient, in order to make him feel comfortable.

> «In general, when the communication content is rather critical and one wishes the communication partner to feel comfortable, extraverts and people low on neuroticism are perhaps better approached via rich media (e.g., face-to-face communication) while introverts and persons high on neuroticism might sometimes prefer media with lower richness level (e.g., e-mail).» (Hertel et al. 2008:40)

In this there is a certain level of ambiguity, as Daft (et al. 1987) claims that performance improves when matching the media to the task equivocality.

Shortcomings Of MRT

During the 1990s, Media richness theory lost support and explanation models where sought in social definition theories (Ngwenyama et al. 1997:146). However, the ranking system provided is still relevant, and I found it a useful tool in describing the differences between email and other media. Robert (et al. 2005) argues that media which is rich in social presence simultaneously increases and decreases performance. While the high social presence increases the motivation to process the information, it decreases the ability. The reverse is similarly true, which means that while it is relatively easy to process large amounts of email, it is a demotivating task, due to the low media richness of this communication form.

The Cost Of Communicating

Benjamin Franklin wrote *«Remember that time is money»*[13]. The time spent communicating with email is time that could have been spent elsewhere. Therefore, reading email has an associated *opportunity cost*. In the early 1990s, Swedish scientist Jacob Palme performed cost/efficiency analysis of email usage, comparing email usage to other forms of communication. Based on previous research by James Bair, it seems clear that the greatest gains can be made by reducing the amount of time spent in meetings. While he somewhat criticizes Bair for only reviewing existing work practices and not accounting for new work patterns that may be enabled by new technology, he still finds Bair's research interesting.

Palme compares communicating by email to communicating by phone, and concludes that email is much more efficient when communicating with more than one individual, but can also be more efficient than phone communications, depending on the number of messages sent.

> «One can thus conclude that electronic mail is almost always more efficient in terms of time spent if you reach more than one person, or, when you only need to reach one person, if the task can be completed with less than four or five messages». (Palme 1995:22)

Much of the reason for this is that Palme expects almost half of the time being spent by unsuccessful phone call attempts, and the fact that during a phone call time is spent by both the one being called and the caller. Based on Bair's research, Palme then claims that on average, *«[...] it takes four minutes to write a message in an electronic mail system and half a minute to read it»* (Palme, 1995:24). The short time spent is due to computer support — there is no need to remember the address of the recipients, and the computer than help with spelling and grammar correction.

13 Advice to a Young Tradesman (1748)

When comparing email to face-to-face meetings, there are certain benefits of using email. Traveling is not necessary, the participants can be selective about what they read and since they read faster than they write, written communication scales much better (Palme, 1995:25). This is somewhat discredited later, as he lists up some of the disadvantages of email:

> «It is more difficult to persuade others, and thus to reach consensus. With e-mail, difficult and controversial issues will more often lead to a war of positions which can only be resolved in a face-to-face meeting. The lack of body language, voice inflections and facial expressions help explain this effect. Thus, negotiations can be difficult to conduct via electronic mail.» (Palme 1995:31)

This is a major drawback — if it is impossible to tackle difficult and controversial issues in email, and it is unsuitable for negotiations, then it can hardly be used to replace face-to-face meetings in general. Palme argues that email is better suited for brainstorming, collaboration and execution, than the decision-making process. To a certain degree it seems as if Palme is colored by his Scandinavian context, where employee participation and solidarity are underlaying values. Email performs best when the message is short and easy to grasp, and it is most effective when targeting a large number of recipients, as the cost of adding a recipient is low.

Critical Mass For Mailing Lists

Participating in a mailing list requires caution because the activities of such groups create chain reactions. Responses can trigger other responses which again can trigger more responses (Palme 1995).

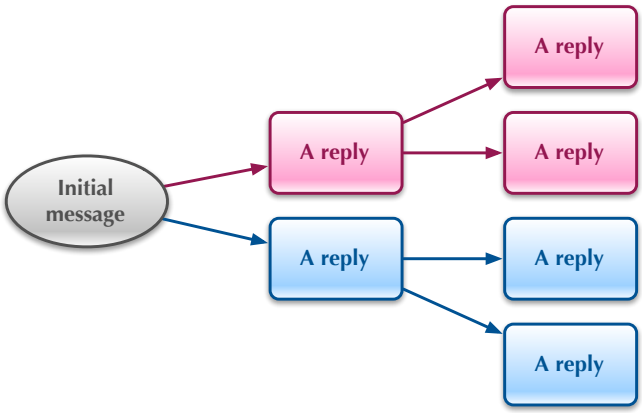

Figure 12. Chain reaction of group discussions in electronic mail (Palme 1995:14).

Further, Palme hypothesizes that by having a group of 21 list members, any email sent to the list would result in a reply. The formula he uses to determine the number of replies is «0,05 x (Recipients - 1)». By applying this formula to a varying number of recipients (0 - 100), the following graph emerges:

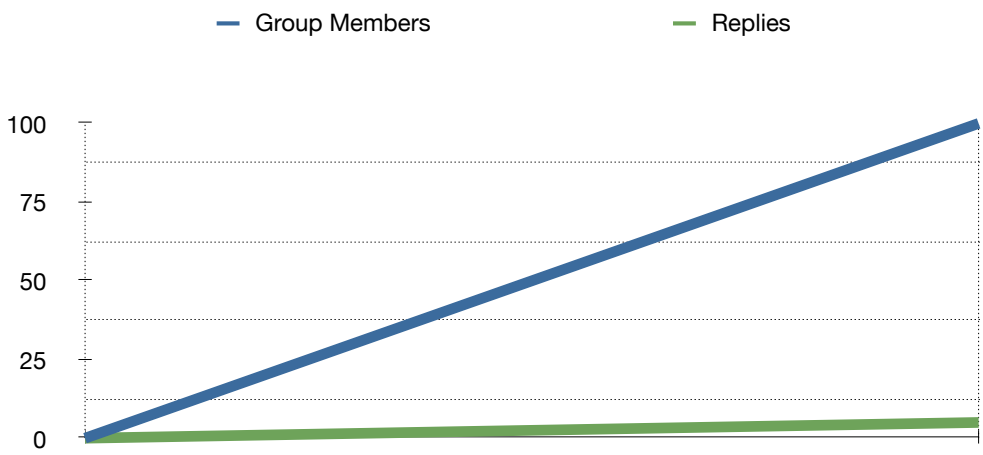

Figure 13. Number of replies depending on group size (Palme 1995:14).

This means that when the group size increases, the email traffic would also increase somewhat. However, this is just the number of replies per message posted. It would be natural to assume that the number of new threads started would also be dependent on group size.

Chapter 3

Methods

There are two primary reasons for employing scientific methods. Firstly, it makes use of the knowledge of previous researchers. By building on studies undertaken by recognized researchers, and using methods proven through years of use, the risk of mistakes are lessened. Secondly, it increases the validity of the methods employed. By documenting how the methods are adapted and applied, others can retrace the steps and verify that they are executed correctly. In this chapter, I will explain why I have decided to use the methods I have chosen for this research project, and I will also document how I have used them. At the end of the chapter I will also discuss the validity and generalizability of my data. The structure of this chapter is based on the suggestions of David Silverman (1995), it follows the basic structure for a qualitative methods chapter.

Natural History

When starting out, all I knew for certain was that there was a lot of email at Opera. I wanted to understand how the Opera employees coped with the amount of email. Was there something special about them or their email practices, enabling them to handle it so well? I also wanted to know where it all originated - I had worked in other organizations where most employees did not even own an email account. The case was intriguing to me.

My research strategy was at first simple - I wanted to interview and observe my subjects. I was sure this would give me the data needed to conclude on the email practices of the Opera employees. As I started collecting data, I came to the realization that no matter how many employees I interviewed, I would not be able to get the opinions of all the workers at Opera. There was such a large spread in the interview statements that generalizing them up to a company level would be difficult. To remedy this and get a clearer picture, I crafted an online survey. Using my interview guide as an outline, I asked questions concerning email usage and how it was experienced.

It was always my intention to compare these results with some «hard data» from the mailing lists.

The initial plan was to simply use my own inbox as a reference, and count emails manually. I realized that this might be a too challenging task as there were approximately 20.000 emails in my inbox from the previous year alone. It was a stroke of luck when the Opera email administrator offered to assist me in this. He was also interested in seeing some of this data visualized, and crafted small applications (scripts) which ran server-side and harvested statistics from selected mailing lists.

I considered comparing Opera email usage with another organization with a different characteristics, but this idea was discarded as the study progressed. When I dove so deeply into Opera, it was partly due to my connections in this organization. It was unlikely that I would be able to get the same level of access in another organization within a reasonable timeframe. I therefore focused solely on Opera; and when looking back it seems to have been an appropriate decision.

Research Strategy

When reading a scientific study, it it is easy to assume that there has been a linear progression from questions and theory, through data collection, finally leading to an undeniable conclusion. My own experience has not been as clean cut, as I started out with questions about the vast amount of email traffic at Opera. While gathering data and reading theory, my perspectives changed several times. Ragnvald Kalleberg (Holter & Kalleberg 1996:33) employs an illustration (Figure 14) to explain the relationship between the entities, showing the interconnected nature of the elements.

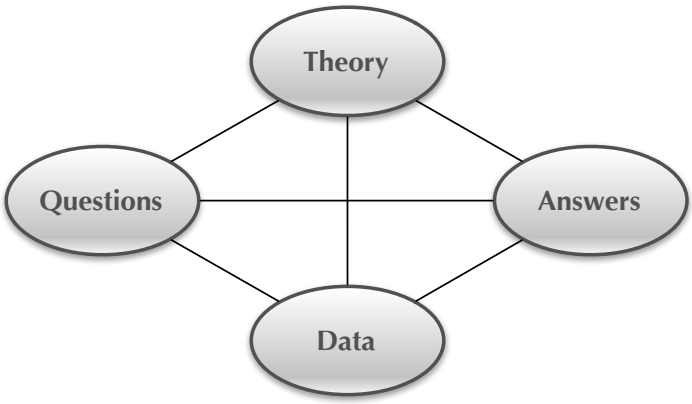

Figure 14. Elements of a research project. From Holter & Kalleberg (1996:33)

My methods are guided by the data gathered, in the sense that the techniques and methods chosen have been adapted to the situation. I desire to illuminate the case from a number of angles, thereby getting a broad perspective - both on the personal motivations, and the consequences for the organization as a whole. Data has therefore been my primary concern and guided my choice of methods and theory.

Research Design And Techniques

The research is comprised of three primary data sources, in addition to my personal experience. By having such a wide number of sources, it is possible to obtain a clearer overview of a subject matter. Using the interview material as a base, I would be able to review the statements, and compare them to the data gathered through the survey and the mailing list statistics, while holding it up to my personal experiences to see whether the data deviates from this or not.

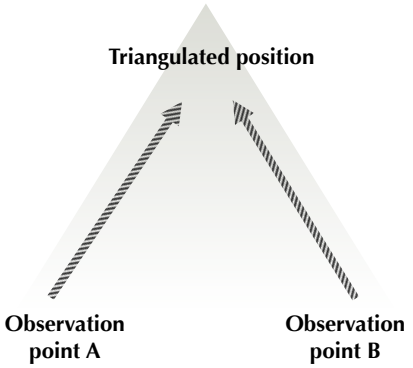

Figure 15. Triangulation.

By using triangulation there is a stronger basis to conclude. However, it is not always possible to map the data obtained with different methods on top of each other in a seamless manner.

> «By having a cumulative view of data drawn form different contexts, we may, as in trigonometry, be able to triangulate the «true» state of affairs by examining where the different data intersect.» (Silverman 1995:121)

Caution is advised in this, as the data material is not more credible just because there is more of it, and it is perhaps even more important to properly analyze the material when attempting to combine multiple data sources (Silverman 1995:122). I have not intentionally used triangulation, but where there are discrepancies between the various data sources, I have tried to describe them.

Interviews

My qualitative data consists of interviews of Opera employees. A total of ten interviews were conducted between fall of 2008 to spring of 2009. The questions were open-ended and loosely based on the interview guide (Appendix A). Most of the interviews were transcribed shortly after being performed. In Table 2 they are listed in chronologic order, and relevant the number will be used when referring to each interview in the thesis.

#	Position	Date
1	Director of internal communications	08.10.2008

#	Position	Date
2	Developer	27.10.2008
3	Developer	17.11.2008
4	Interaction designer	18.11.2008
5	Developer	18.11.2008
6	System administrator	20.01.2009
7	Developer	31.01.2009
8	Developer	03.02.2009
9	Product manager	03.02.2009
10	Product manager	11.02.2009

Table 2. List of interviews.

I have used excerpts from most of the interviews, although some have been cited more frequently than others. When selecting whom to interview, availability was a factor. Opera has satellite and sales offices around the globe; but my selection of interviewees consists almost entirely of staff from the Oslo office. There is a variety of nationalities represented, but it is not possible to represent all nationalities at Opera without making a much wider selection. Also, as the survey provided me with solid answers in many cases, I could have opted to keep the interviews open instead of semi- structured. But as the survey was crafted after the interviews started, I did not want to change the interview guide once it had been taken in use.

Observation / Experience

While the interviews may be my richest source of qualitative data, working at Opera from 2005 to 2008 has allowed me to experience the culture Opera first hand. Just as the interviews, the first hand experience is limited to the Oslo office, but I communicated and worked with staff across the globe, which at least gave me a restricted impression of their culture. I will not use the information gathered while working there as a primary source of data, but rather see whether what I discover by other means match the experience I have had. The background information has been invaluable in interpreting the other data, as it enables a much richer understanding of what my data meant in different contexts. I have also had access to Opera staff as well as my interviewees throughout writing this thesis, which has been of great value.

Survey

After conducting the first interview, it became clear to me that a broader understanding of what the employees at Opera really thought of email would be a great asset. Ten interviews, with non-randomly selected people would not give a strong basis for saying something about Opera as a

company. I therefore crafted a survey, using an online tool provided by the University of Oslo[14]. The survey was open for one week; from the 26th of January 2009, until Friday the 30th. Invitation to participate was sent to the staff mailing list at the Oslo office, and a reminder was sent the day before it was ended. All in all, 125 chose to fill out the form, which is approximately one fifth of the Opera staff. The survey data can not be generalized to the entire population of Opera employees, as the participants were not randomly selected. Furthermore, the selection is solely based on employees at the Oslo office, which further limits the scope of the data. However, the findings in the survey do not deviate much from what is expressed in the interviews, or do they contradict my experiences working at Opera. The survey data is therefore not entirely without merit, but I advice the reader to exercise caution when interpreting them.

Email List Statistics

I was fortunate to get access to the email list statistics directly from the source, which means that they are, unlike some of the other data - highly reliable. However, they are somewhat limited in scope by their nature, and it is important to stress what these data are not. Firstly, I will present an overview of the data. The data is a collection of senders per list, with time stamps. I have rather crudely processed the data into yearly categories, and counted the number of yearly instances per list, in order to get an overview of the amount.

The data is taken from numerous internal mailing lists. Two of these I have been allowed to name in the thesis, whereas the others I will describe by their function instead by their internal name. I have grouped them according to who the lists are intended for, and how membership is organized. Some lists, such as the *staff* list, are mandatory when working at Opera. Then there are some to which new employees are automatically subscribed, but that they can opt out of. Lastly there are some lists which are opt-in, where interested parties can join.

List name	**Primary recipients**	**List membership**
Staff	All employees	Mandatory
Nonsense	All employees	Opt-out
Technical list 1	Employees	Opt-in
Technical list 2	Employees	Opt-in
Team list 1	Team members	Mandatory
Team list 2	Team members	Mandatory
Office list 1	Local workers	Mandatory

14 http://nettskjema.uio.no (read 12.05.2009)

List name	Primary recipients	List membership
Office list 2	Local workers	Opt-out

Table 3. Mailing lists.

It is important to note that these do not include all of the mailing lists at Opera. I was asked to select some mailing lists for statistics. I therefore selected mailing lists which would reflect a likely composition of lists for an Opera employee. I believe they adequately represent the email for the typical employee, with one important exception: it does not include project mailing lists. The reason for this is primarily practical; the project lists are not centrally organized and thus obtaining data from them would be much harder. I was uncertain of the data format and how much work it would require to generate statistics based on the raw data. Therefore limiting the scope seemed to be the safer choice.

Reflections

Initially I chose to use qualitative methods, because I believed that it would give me the best understanding of the actors reasons. I wanted to know not only how people treated their email, but also their reasons for doing so. I knew that deciding on methods early was important, also when conducting qualitative studies. Silverman (2004) argues that the gathering of qualitative data should be conducted in a structured manner, and this is a view I subscribe to.

> «Both qualitative and quantitative researchers are concerned with the individual's point of view. However, qualitative investigators think they can get closer to the actor's perspective through detailed interviewing and observation» (Silverman 2005:10, quoting Denzin and Lincoln 2000. Silverman's' emphasis).

While observing practices are important, their reasons for following these practices are even more important.

> «[...] quantitative researchers are seldom able to capture their subjects' perspectives because they have to rely on more remote, inferential empirical methods and materials» (Silverman 2005:10, quoting Denzin and Lincoln 2000. Silverman's' emphasis).

When conducting research in the software business, the two most frequent methods are interviews and observation. I therefore decided early that one-on-one interviews would be appropriate for learning about individuals' email habits. With my agenda being relatively open, I chose to use open-ended interviews as much as possible, as my primary goal was to establish the nature relationship between the interviewee and his inbox.

Some claim that research is about creating verifiable results. This means that if another researcher applied the same methods to the data material, he would get the same result. When working with people, it is not that simple. If one were to obtain a sufficiently large sample size, it would be too large to make qualitative analysis possible (Silverman 1995:127). A radical strain of qualitative theorists argue that it is possible to generalize from a single case, as every individual that is part of the same culture will embody it (Silverman 1995:134-135). This is analogous to the human DNA, where every cell contains the encoding to create the structure of the entire human body. Therefore it would not matter from whom the data is sampled, as they are all bearers of the same possibilities for creating the whole. The opposite would be to view everything as inseparable from its context, making generalizations impossible (Flyvbjerg 2004).

In the case of this study, it does not aim to create a grand generalizable theory. Instead my hope is to be able to shed light on the practices surrounding email usage at Opera Software. There are some weaknesses with my study that limit generalizability. At the end of writing my master thesis, it seems as if the one thing I have learned the most about, is how to write one. I know for certain that if I had known what I know today two years ago, I would have made different choices.

Chapter 4

A Communication-heavy Innovative Organization

The following four chapters are devoted to the presentation, analysis and discussion of key findings. In this chapter I will discuss how Opera qualifies as an innovative organization, and the consequences for the importance of communication. I will then discuss the volume of email, and how it has changed during the last few years, before concluding the chapter by exploring the organizational culture which differentiates Opera from other organizations.

The Operational Adhocracy

In order to classify Opera as belonging to Mintzbergs' (1983) configurations , it is necessary to identify the key aspects of the configuration. The main means of identifying an organization in Mintzberg's topology, would be to look at how work is coordinated within the organization. In the case of Opera, coordination takes place through *mutual adjustment*. The main reason for this, is the professionalism of the employees. In order to work as a software engineer, a Bachelor or Master's degree is usually required. Well educated workers rarely follow standardized work procedures, as following those would not make good use of their professional training.

The organizations typically employing educated workers are *professional bureaucracies* and *adhocracies*. To decide which of the two Opera belongs to, it is necessary to review the kind of work that they do. It typically consists of developing new products for the markets or its clients. There is a low degree of maintenance work, as much of the work is research-driven. As such, it is not well suited for *standardization*. Because standardization is not an option, and the workforce is highly educated, the coordinating mechanism of choice is mutual adjustment. The organization can be described as an adhocracy in Mintzberg's (1983) taxonomy. As the core activity of Opera is software development, the central part of the organization is the *operating core*. Opera therefore falls under the subcategory *operational adhocracy*.

A defining characteristic of adhocracies is that they are communication-heavy organizations. The communication is necessary to facilitate innovation. According to Mintzberg: *«People talk a lot in these structures; that is how they combine their knowledge to develop new ideas»* (Mintzberg 1983:277). In the case of Opera, it would serve to rephrase this statement: Opera employees email *a lot*.

Innovation Requires Communication

What does being innovative really mean? Contrary to popular belief, it does not involve bright coats, flashing lights nor witchcraft. The inventions made at Opera are the result of employees solving one small problem at a time, often combining knowledge from several fields in new ways. This process of innovation is also known as *knowledge creation*. It is a labour-intensive process, and most of the time it is evolutionary, rather than revolutionary. Opera is at the forefront of web technology. It is part of the World Wide Web Consortium (W3C), in which it helps creating the standards for new web technology. By the nature of the work on this *bleeding edge*, innovations are commonplace, albeit most of them are small.

To support the innovative process, effective communication and coordination are essential elements. By staying informed about the work taking place elsewhere, it is possible to solve problems more effectively. Failure to stay informed can lead to poor decision-making, and in the worst case scenario similar tasks are being done two places at the same time in the organization. This was seen as acceptable when the company was smaller, but as Opera grew the consequences of poor communication grew with it.

> «[...] when there are upwards to 50 people in Japan, you can no longer say that [they need to make sure they are informed], it is too much to expect. They do not have the capacity to follow us up all the time.» (Interview #1, my translation)

Therefore it is in the company's best interests to make sure that the communication channels used are the correct ones, and that they work well. When I was employed at Opera, I was quickly aware of the fact that email is the most important communication channel. One of my interviewees described email as the *information center*. Without access to his email, he would be out of touch with the organization.

> «[...] in the beginning I was not used to email. So I would not use email so much. But now it is kind of the information center. If I did not have email for my one month of vacation, I would have absolutely no clue what is happening at Opera. I would have the tiniest clue about what the lunch menu is, because that is put up on the Intranet. But nothing important. I would be blank.» (Interview #7)

While working at Opera, the position held by email was rarely discussed. I can count on one hand the number of phone calls I received during my stay. There is a tacit understanding and expectation of email usage.

> «[...] the whole company evolves around mail. It is the main means of communication. [if] You don't understand how to do mail, how to use this tool, to the maximum, you are not fit to work in a high-tech company like Opera.» (Interview #8)

I will later detail what is meant by *using email to the maximum*, as this is deeply rooted in the Opera culture. The developers expect each other to be skilled email users - whether this is a realization of its importance for coordination or if it is an expression of culture is not fully clear.

The Volume Is Increasing

If communication is required for innovation, email is required for innovation at Opera. How much email do the Opera employees receive? This can only be truly measured by counting the number of incoming messages to their inboxes. In the survey I asked how many emails they received on an average workday, which at least says something about what the employees *think they receive*.

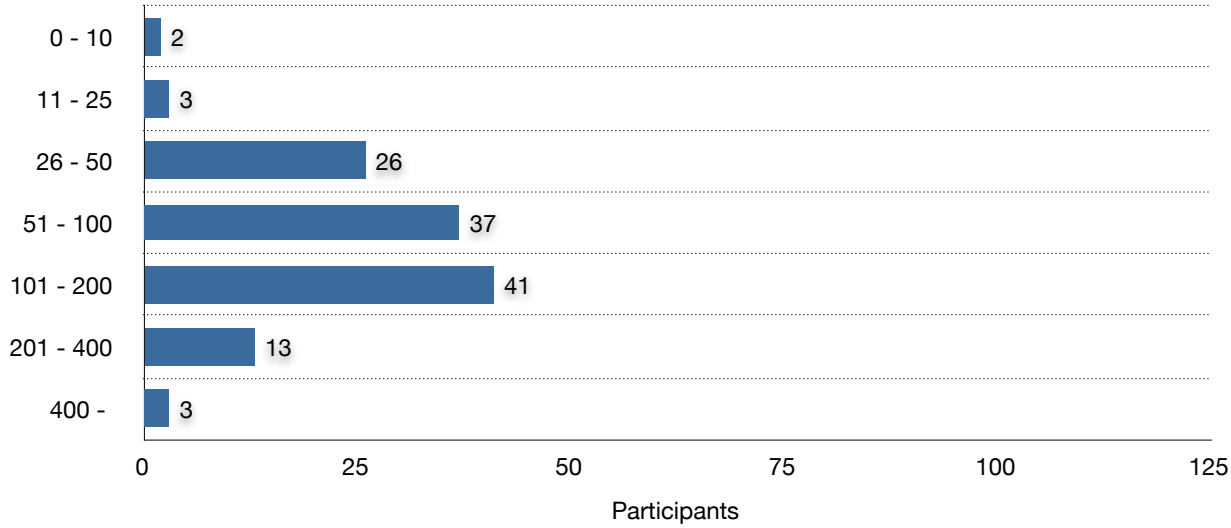

Figure 16. How many emails do you receive on an average workday?

Most report that they receive between 101 and 200 emails per day. This is quite a lot. According to Palme (1995), reading an email message takes on average 30 seconds. Reading 100 emails would thus require approximately an hour per day. This, however, does not match my experience while working at Opera. Reading an email could take anything from ten seconds to ten minutes, and by reading *and acting* upon the email I would often spend several minutes.

Those who participated in the survey claim it, several interviewees stated it, and the statistical data confirms it; the volume is increasing. But to what extent, and for what reason?

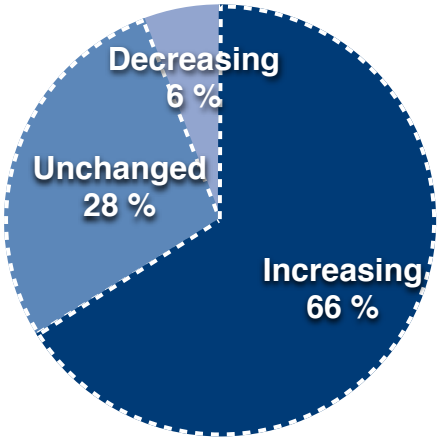

Figure 17. Is the volume of email you receive increasing or decreasing?

The overall trend is that volume is experienced as increasing, according to two thirds of the surveyed. As we can see, most receive over 100 emails per day. Furthermore, the number is increasing. It is not just the number of emails that increases, the size of each individual email increases as well. Not necessarily because of more text, but rather because of richer formatting and larger attachments. *«It is in general, not just at Opera - everyone receives much more email now than they did before. Both in size and number»* (Interview #6, my translation).

Failure to use email correctly is considered rude. While using email technology can be relatively simple, the rules of how to use it, and their importance, are well hidden. Another sentiment that was recurring during the interviews, and that also appeared in the questionnaire results, is that most employees think there is is too much email. This presents itself in several ways. One of them is the expectation of constant checking. As a result, many have adopted a strategy to check their inboxes in their spare time, before and after work, in order to stay ahead of the game. Because of this, it is clear that email has penetrated the boundary between work and private life. Roughly one fourth of the respondents say that they check their inbox before and after work every day.

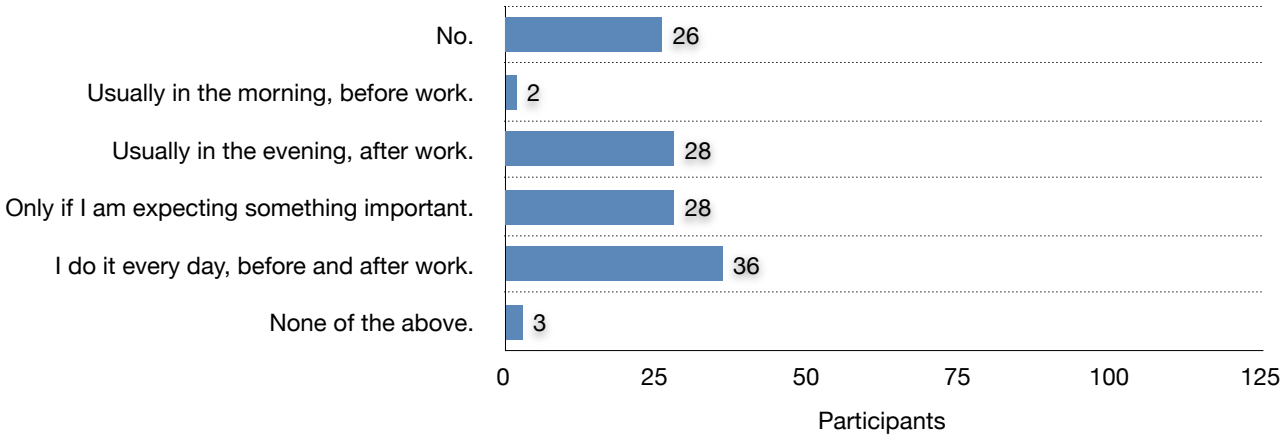

Figure 18. Do you check your inbox in your spare time?

From the figure above it is evident that it is much more popular to check for new email in the evening than in the morning. Based on my experience, I would estimate the workday to be closer to lasting from 10 to 18 than 8 to 16. The problems with known solutions are fixed quickly, and then time is reserved in the evening to ponder those problems with unknown solutions. This is often done with the knowledge that it might take a while to come up with a good solution, and it is not uncommon to work until after the sun sets. Coming up with an elegant solution to a complex problem is valued highly by most developers. Those who have proven their ability to come up with these solutions gain respect among their peers.

Considering the data from the survey, the Oslo staff are subscribed to quite a few mailing lists. Amongst those asked, it is most common to subscribe to 10 mailing lists. I have data from a total of 8. Based on the data it seems equally common to have many mailing lists. While nobody reported to be subscribed to less than two mailing lists, there were individuals who weresubscribed to more than 100.

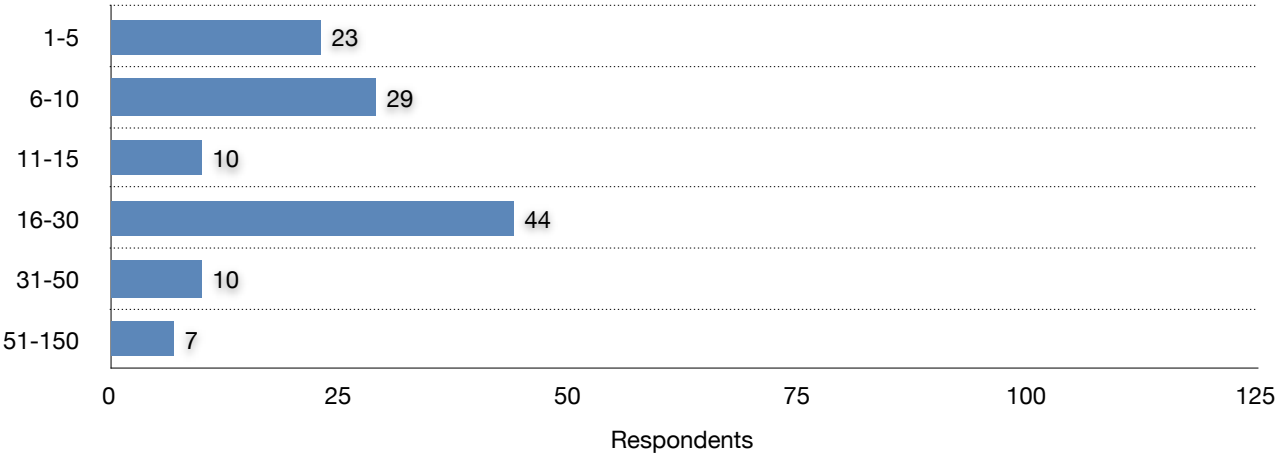

Figure 19. Number of subscribed lists.

Processing mail takes time, which again means that there will be less time for other tasks. Internal communication is not rated as highly as time spent writing code, talking to customers or testing. This explains some of the anger expressed towards email, as it is seen as a hindrance in performing one's work. One of my interviewees reasoned about the time he spent in his email client, and how it made him less effective:

> «So if you are to process the amount of information that enter your inbox, it requires at least 3 hours of your day. And that is half of my day. The rest of the day you are supposed to actually get something done.» (Interview #10, my translation)

As will be detailed later, not all email gets the same treatment. One of the consequences is that an

increase in one type of email may be seen as a problem, whereas an increase in another type of email can be handled easily.

Culture

Opera consists of several nationalities. It was founded in Norway, and its roots in Norwegian culture do affect the company, despite the number of nationalities represented. Interestingly, when asked about culture many interviewees described aspects other than nationality or ethnicity. Still, Opera is both a multinational and multiethnic company, which has given them publicity in Norwegian newspapers on several occasions[15][16][17][18].

Nationalities And Languages

With over 50 different nationalities represented, it is surprising that the interviewees place so little emphasis on the impact they have on company culture. This could be due to my relatively small sample size, as it is impossible to get a clear impression from the point of view for over 50 different nationalities with only ten interviews. Regardless, there were some clear distinctions apparent, especially between Norwegian, Indian and US work culture. In India, it seems to be common that employees are not vocal about their opinions. One of my interviewees claims that he does not have any strong opinions:

> «I do not really have strong views about something, anything as such. And I never really have strong views that «OK I have to jump into this discussion and give my viewpoint», unless it is something really important [...].» (Interview #2)

Another of my interviewees confirms this viewpoint, saying that people from India are not supposed to have opinions. I assume this to be what the first interviewee also meant, as from my experience most people have opinions, even if they feel sharing them may be inappropriate.

> «In India people do not have opinions, mostly. Or they are not supposed to have it, based on the work culture. If the boss says something, that is what the boss said. So either you follow it, or you quietly and discretely discuss it with the boss, and have the boss change his opinion in another email. You do not respond back to a mailing list complaining about the stuff the boss just said. Because the boss is the boss.» (Interview #7)

This is radically different from my personal experience with Norwegians, as they do not only feel

15 http://www.aftenposten.no/fakta/innsikt/article2679083.ece (read 13.05.2009)

16 http://www.vg.no/nyheter/innenriks/artikkel.php?artid=167256 (read 13.05.2009)

17 http://www.bt.no/na24/article330021.ece (read 13.05.2009)

18 http://www.nytid.no/arkiv/artikler/20060920/programmert_suksess/ (read 13.05.2009)

that they have a right to share their views, but that they have an obligation to do so. This could be related to the long-standing tradition of participation and workplace democracy, found in Scandinavian countries. Since Opera has Norwegian roots, these traditions are part of Opera's work culture. While many Norwegians hold these values in high regard, they pose problems to people from other countries, who find it hard to actually get things done:

> «So in a sense I would say, if you are trying take things in a certain direction, it is easy. But if that direction was wrong, nobody will complain and things will screw up. Which is bad. In Norway, if you try to take things in a certain direction, it is impossible because everybody will have opinions and want to go different ways. Which is good, because you get lots of ideas, but none ends up anywhere, which is bad.» (Interview #7)

The impression is that the amount of discussion in Norwegian work culture makes it much more difficult to execute good ideas. It will be near impossible to reach a conclusion; and without a consensus nothing will be done. This view is supported by another one of my interviewees, from the US. He describes the impact this has on email discussions, where Norwegians are eager to respond with a conflicting opinion, even when that means disagreeing with one's manager in the open:

> «Culturally, coming from the US, the business culture, to the Norwegian culture, there is a difference there, and it shows itself in how email works. [...] Threads tend to be longer. And more people tend to feel they have a right, and a responsibility maybe, to share their opinion, about some issue. I think in the US more often you would see a reluctance to offer their opinion in a thread, because of the fear of offending somebody who is higher up than them, and could possibly make it difficult in their job should they say the wrong thing.» (Interview #4)

His experience is that even when a person carrying legitimate authority in a field gives his views on a matter, in the US, the discussion would end. Norwegians, on the other hand, feel inclined to share their views, even if that means disagreeing publicly with leading officials:

> «So there is [in the US] less of an openness to the discuss in an email thread, it is often just various needs for information, until the person with the correct authority and information delivers the correct information and the thread stops. Whereas here in Opera, I have noticed that threads begin, somebody somebody who is in a position of authority will even give their opinion, but that opinion will then be discussed with other people, the other people in the thread will feel just fine saying «I disagree with you, Mr. CEO».» (Interview #4)

While being open-minded about one's opinion might be beneficial in certain settings, there are other consequences than those potentially facing the individual should he offend his leaders. Email discussions are rather fragile beings, as the low threshold that enables the pesky Norwegians to argue with their boss also can result in endless arguments. One of my interviewees sees this as a particular problem with email discussions, where there is no one to control the conversation. He

thinks the source of this problem could be the lack of a meeting facilitator, who can make sure the discussion stays on track.

> «No, it [Norwegian work culture] can work well with email, but it would be better if they had team meetings instead. Because it is good to have opinions, and have ideas, and find out what are we doing and why are we doing how do we do it right. But there is always the need of an opinion manager. Who tries to understand «OK, we are talking about this topic, so lets fix it and then talk about something else». In email there is no opinion manager.» (Interview #7)

While I think the title of *opinion manager* might not sit well with those pesky Norwegians, the interviewee raises a valid point. In order to be an effective tool, the email discussions require self-restraint from all the participants. Therefore there are certain rules that need to be followed. I have named them *The email code of conduct* and I will be discussing his in further detail in Chapter 6. However, those rules fit into what can be described as the *nerd culture*.

The Nerd Culture

While I expected my question about Opera culture to result elaborations on all the various nationalities represented at Opera, often it did not. Instead the interviewees would talk about what I have chosen to call *the nerd culture*. I am aware that it is a somewhat charged word. I use it to describe the extremities of the social interactions, as this is not an exhaustive description on the nature of this culture.

The question about Opera culture often resulted in responses such as this:

> «When you say «cultures», I take it that you mean various countries and nationalities, and that I have not noticed much of. There is another type of culture here, the «nerd culture». The slightly «geeky» people who gets a rise out of being able to answer mostly everything, being constantly right and enjoy discussions and arguments. We have several of those in this company.» (Interview #9, my translation)

When asked about culture, the respondents and interviewees often described a global *nerd* culture. A common saying when I started was that *Opera is run by engineers*. The employee's background did not seem to determine their culture, as their education and technological background were more important factors.

> «The people who work here are more alike than one might think even if they are from many different countries - they are very much alike based on their education and background.» (Interview #1, my translation, corrected)

It is really an incredible thought - one of the Norwegian companies with the most nationalities represented claims that the employees are basically all the same. However, there are certain negative aspects of this culture. It is perhaps most visible on the discussion mailing lists. When

someone fails to live up to the email *Code of Conduct*, it is seen as disrespectful, and usually socially sanctioned. One of the interviewees does not fully approve of this practice, and brands it *dogmatic nerding*:

> «Well… There is quite a bit of dogmatic nerding regarding how email is supposed to look and be used. And you do notice there is a difference in how engineering and marketing and human resources express themselves. Down to the detail level such as how to quote and all that. Which is not all that important in my opinion.» (Interview #3, my translation)

This is perhaps the negative aspect, or the dark side, of the culture. The Code of Conduct is seen as essential, if you break the rules you risk public lynching. However, there are several positive aspects to the nerd culture. This gives the Opera employees a common frame of reference. I would describe the nerd culture as a form of monoculture, something that most Opera employees subscribe wholly or partly to.

Chapter 5

Practices That Generate Email

In the previous chapter I described the amount of email and its role in the organization. I have also touched upon the origins of email when describing the volume. Just as there are some peculiarities with Opera as an organization, there are also unique practices in place generating email. In this chapter I will describe some of these practices, and discuss their reasons for existence.

A High-Speed Communication System

An essential component of email usage are the mailing lists. The mailing lists are used to keep people updated on what is happening around them. Even if it is not of direct relevance to every individual on the list, there is a belief that by sharing possibly relevant information, coordination can improve. For many developers, these mailing lists are considered the right tool for the job:

> «Mailing lists are kind of required, to organize things. The projects, lots of people different offices, and so on. Some are completely nonsense and wide, and some are more, well, on-topic, purely technical, and per-project and so on.» (Interview #5)

This sentiment is common, which in part explains their immense popularity among developers. One of my informants somewhat enthusiastically stated that *«It works. And it is transparent, and traceable. That is all you want to work.»* (Interview #5). However, not all mailing lists are of the same kind. The last years, a certain strain of mailing lists has emerged: the project lists.

> «One thing that has exploded are project lists. We have created an incredible amount of those the last years. When it came- --they were not as common at first, but after a while it started being very popular to run project lists. They are working lists, often are outside partners included on those lists. Some projects has both a company internal list and an external list where they bring on the partners. In this area there are really many lists now.» (Interview #6, my translation)

These mailing lists are now wildly popular, and there hardly exists a project without at least one such list. Their popularity is due to their usefulness. Opera has a matrix structure, in whichprojects

are formed with members selected from various teams across the organization. The project lists, even to a larger extent than the other lists, act as a coordinating artifact. Its participants may be located with their original team, yet they do not coordinate with the people with whom they are physically located, but rather with the individuals on the project list.

The popularity has lead to high amounts of traffic on some of these lists, perhaps even more than on the company-wide discussion lists. Unlike the these lists, there is no central overview for the project lists. They were not intended to be the way project teams worked, but it ended up that way because the project lists worked so well. Due to this, the project manager was often responsible for the list. They were ad-hoc lists; befitting of the adhocracy.

> «Some of the project lists are highly trafficked. I have thought about it for years, to create a better overview. But there is something about our system for mailing lists, it is not really made for running private lists. They have been closed, so often only the manager know what the lists contain. And they do not always know either, because we often change managers.» (Interview #6, my translation)

The lack of central control led to problems when projects changed managers, as the these would forget about their ownership of the lists. As such, there is a certain degree of chaos. One of my interviewees expressed concerns regarding the newcomers, as the mailing lists archives are often seen as one of the most valuable aspects of mailing lists; especially for new employees. If they do not know what mailing lists are available, they do not know what lists may be relevant for them: *«The list of all the mailing lists is not exposed, or published, so it is difficult for people to find them»* (Interview #5). This is the problem of being on a *need-to-know* basis; you cannot ask for what you need to know, because you do not know what you need to know without knowing all there is to know in advance.

Discussion Lists

The mailing lists are often referred to as *discussion lists*. Ideas, solutions, interesting stories and irritations; they are all expressed in these lists. While they are frequently used for discussions, they are rarely where decisions are being made. One of my interviewees, perhaps as a result of previous experiences, said that: *«I firmly believe that decisions cannot be made by email, at least not important ones»* (Interview #10, my translation). Since the purpose of email discussion is not necessarily to change behavior, it sometimes can be about being *right*, or about *moral superiority*.

Due to the nature of email discussions, they can be hard to control. There is no authority inside the email client or the mailing list software, each and every list member has to judge for himself what is appropriate. Discussions can easily spin out of control.

> «Usually on email, it is very easy for it to just go haywire. Because there is no meeting manager inside an email. You just hope the email stops when it should stop. Some

> emails just do not die. They just multiply into a hundred responses of total nonsense. Or not nonsense - a hundred responses of random opinion, which is not what the original emailer wanted to happen.» (Interview #7)

Even if you start a thread, and thereby *own* it, you have no special privileges; others can post whatever they want in *your* thread. It also means that unless you know the list participants very well, there is always the risk of a discussion getting out of hand. If there are too many discussions, and they are not viewed as relevant by the members, the value of the communication channel decreases.

> «Often there are more discussions than information, and when you are not very interested in those discussions they end up as distractions more than anything.» (Interview #3, my translation)

Based on my experience, there are then two likely outcomes when the members feel the discussions have gotten out of hand. Either the individuals discussing are sanctioned, or they pay less attention to the lists. Regardless of the outcome, this noise diminishes the value of the mailing list as a communication channel.

Communication, Notification And Mailing Lists

Simply adding more people to the organization does not automatically increase the amount of email. However, email usage at Opera has one defining characteristic; how they coordinate and organize themselves and their creative work: *«Email is the primary method of communication, for better or worse»* (Interview #10, my translation). The consequence of this is that email does not take a break, it keeps on coming. As Opera is a global company, communication does not pause during nights or weekends. When it is midnight in Oslo, it is morning in Tokyo.

> «It is expected that you read email constantly, and there is very much of it. I know that when I get to work on Monday, there will be hundreds of emails that arrived during the weekend, between six on Friday and nine on Monday. And this is both because we are are a global organization and that people work abroad, but also because people are idling in their mail client all the time. There is simply too much email.» (Interview #10, my translation)

Being connected to so many different locations means that there is always an active conversation somewhere. Another aspect of using email as the primary communication channel is that the traffic is directly tied to the number of communicators. When the coordinating mechanism is mutual adjustment, each new member added to the organization will need to align himself with the existing members, thereby adding to their communication overhead. This is one of the reasons why operational adhocracies usually are small; coordinating with mutual adjustments in large groups incurs enormous overhead.

Notifications

Because email is such a versatile and popular system, several of Operas internal systems use it for notifications. These are short, automated emails informing the recipient that something has changed in a system he is using. In the case of Opera, this could be several types, including a comment on a bug report, information about finished build or a calendar reminder. The result of this practice is especially visible when returning from vacation — one of my interviewees reported over a thousand *useless* emails were waiting in the inbox:

> «When I was on vacation, everyone knew I am on vacation, because of the auto-response thing. And I still had about 2300 mails when I came back after one month. Out of which, a thousand were completely useless, they were just notifications about builds and things.» (Interview #7)

If this were the case for all of the employees, then roughly one third of all email would be notifications. One of my interviewees did not approve of using email for notification, and said this was his prime concern with email management at Opera: *«I think email is being properly handled in some circumstances, but generally mishandled, in that email is being used as general notification»* (Interview #4). That other systems are wanting to piggyback on email is a testament to its success, but as an unintended consequence it adds to the total overhead experiences by the Opera employees.

Mailing Lists

One of the largest contributors to the inboxes at Opera are the mailing lists. They are used to coordinate work and discuss topics of interest. In the survey I asked how large the contribution was, and the result was not surprising, as most reported that mailing lists accounted for more than half of their inbox content.

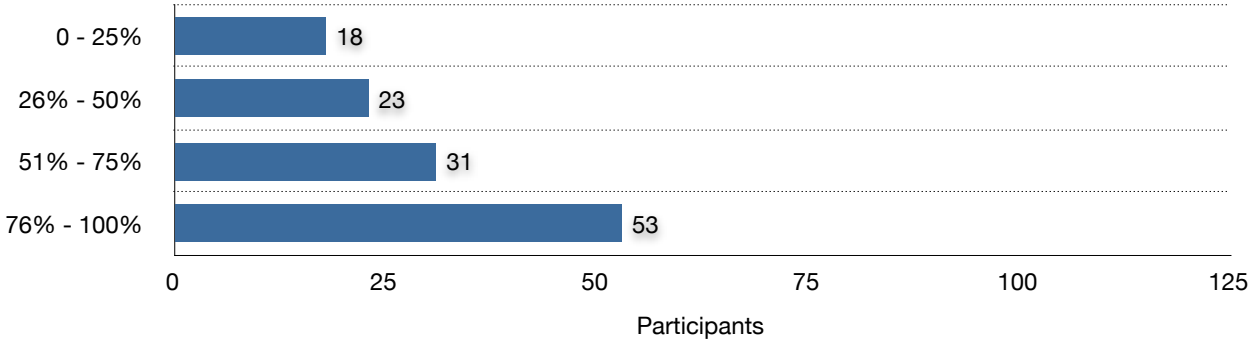

Figure 20. What percentage of your email is from mailing lists?

What is considered to be a list is not entirely clear, as mailing lists at Opera often serve the function of notifications, as mentioned above. It is, however, quite clear that the majority of email at Opera stems from these lists.

Based on data from some of the most active lists from 2000 through 2008, it is not hard to understand why they make such a large contribution. At first there were only a couple of active lists. As the volume increased, several lists were created. By merging the data for all the lists for which I have data, the following graph emerges:

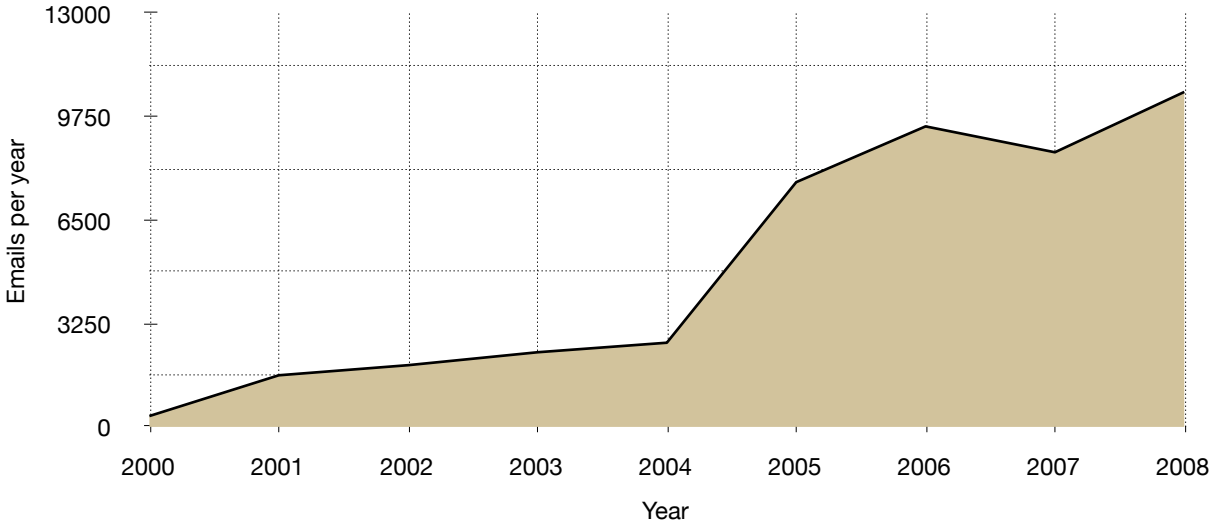

Figure 21. Email from lists for a developer in Oslo.

This graph shows the email received from company-wide mailing lists for a typical developer, assuming that he has signed up for two discussion lists — which is not uncommon. There is a drastic increase in the amount of email received from the lists. In 2008, this developer would have received 10.532 emails from these lists alone. Assuming 250 workdays, that amounts to more than 42 emails per day from these lists alone. A logical conclusion is therefore that for an average employee, managing email constitutes a larger part of the job now, than it did before.

Project Lists

In Figure 16, I asked how much email the Opera employees received on a normal workday. Most report that they receive over 100 emails per day - which is much more than the 42 from the mailing lists for which I have data. Yet, according to Figure 20 the mailing lists make the largest contribution to peoples inboxes at Opera. So where does the rest of the email come from? One possible cause is direct mail. However, that is not likely to be the only explanation, as most of my interviewees reported the number of direct emails per day as being relatively low:

> «My filter designated to «what I feel I should probably look at» is closer to 10 - 20 emails per day. That are either directly to me, you know, have me in the «To:» line or the «CC:» line. Or are to a group that I have responsibility to look at emails coming in there.» (Interview #4)

Therefore, the emails are not from direct email. I speculate that the project lists, which I was unable to gather statistics for, have experienced a massive growth. This could also explain why

growth of the company wide lists seem to have stagnated. By merely following the trend from 2004 to 2005, I have come up with the following graph:

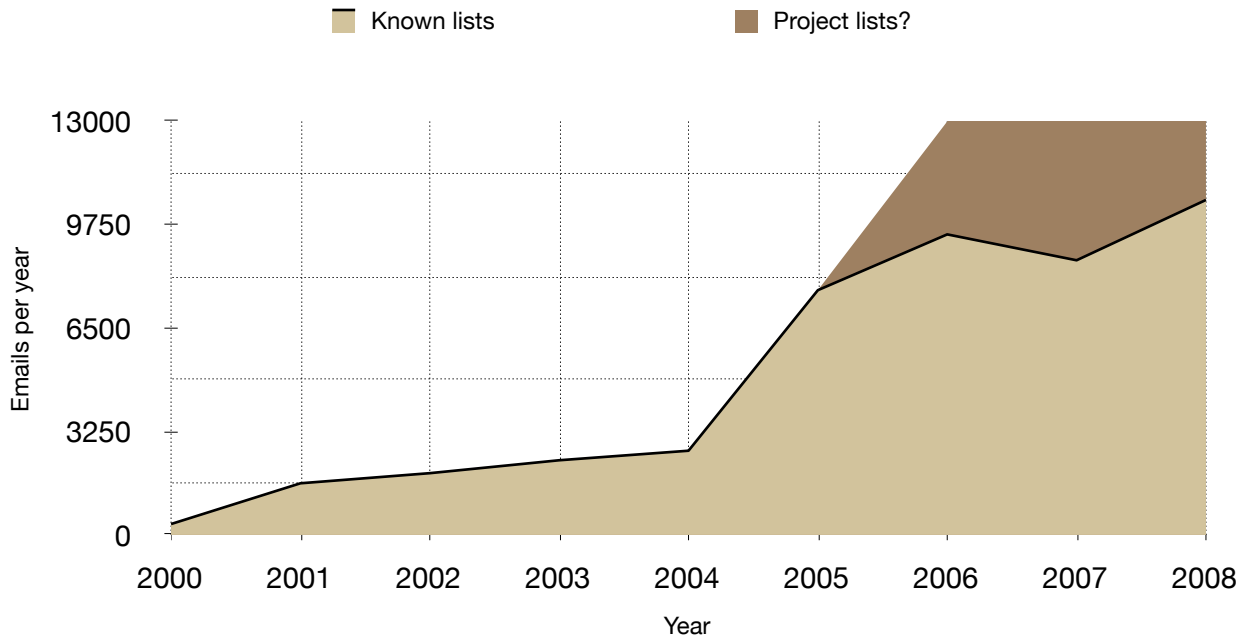

Figure 22. The unknown project lists.

Why this shift towards the project lists? It seems illogical for the growth curve to flat out, as the company has not stopped expanding during this period. One of the interviewees describes how the informal mailing lists have stopped expanding, attributing this to social factors — once the traffic reaches high enough levels people start unsubscribing:

> «The informal, or social lists, have stagnated, or stabilized at a certain volume. There cannot be much more traffic on «nonsense», or people will start unsubscribing.» (Interview #6, my translation)

I will not go further into speculation until Chapter 7, in which I will explore this further with the help of Palme's hypothesis concerning critical mass.

Preferring Email

The email volume constantly increases. Why is this communication channel still the most popular for coordination within the organization? In this section I will explain why email is so popular, and how it relates to other media used in the organization. The Opera employees *like* email. Roughly half of those who answered the survey said email is their favorite communication channel. It is appreciated for its asynchronous, non-intrusive nature, and for being easily saved for future reference. It therefore comes as no surprise that they are inclined to solve tasks by email. Even tasks for which email is considered unfit, there seems to be a push towards using it, such as for

agreeing on meeting dates.

On a scale of media richness, email would hover a short distance from the bottom, depending on whether the email is sent directly or as a bulk email. The low level of richness makes email particularly unsuited for coordinating tasks that are highly equivocal. I would argue that many tasks carry a relatively large unknown X-factor in an innovative organization. It is therefore a strange match indeed - an organization in which *mutual adjustment* is the way to coordinate that this is done with a medium that ranks among the lowest on the media richness scale.

Hertel (2008) offers a possible explanation for this anomaly. He claims that introverts are more prone to favor media with a lower richness: *«[...] extraversion and neuroticism as significant predictors of media preferences»* (Hertel et al. 2008:2). Matching the media to the individual makes them more comfortable when communicating. Of course, this is not the only explanation. Another reasonable explanation would be the *low cost* of sending an email. Since most of the Opera employees work at their computers, sending email is very easy for them, it is often just a click away.

At Opera, tasks are solved by email. Not only for simple requests, but email is used for things to which it is not particularly well suited. One of my interviewees illustrated this with an attempt at doing the *impossible*.

> «If you are coordinating a meeting between five people, where two are abroad, one in Japan and one in the U.S., you do not stand a chance. It is simply not doable. You will be sending 20 emails, just to coordinate this one-hour meeting. And that is just *your* time. The others also needs to figure out a good time for them. There are always someone who cannot come when you want it, and it will all end up too complicated. This is email used for.» (Interview #10, my translation)

Agreeing on dates can be a daunting task, but the asynchronous nature of email makes it particularly unsuited. The result is that efficiency suffers. In some cases, the entire coordination attempt failed to such a degree that the meeting facilitator was observed running around with his notepad and pen to schedule the meeting on paper, after failing at agreeing on time and date by email. However, this is a deviant case. The vast majority of email is generated on mailing lists.

In the survey, I asked what the participants communication media of choice was, barring that face to face interaction was not an option.

What is your preferred communication channel?	**Responses**
Email	64
IRC	26
Skype	17

What is your preferred communication channel?	Responses
Other instant messenger	10
Phone	7
Other	1

Table 4. What is your preferred communications channel?

IRC is the second most popular choice, with Skype on the third place. I asked why this was their communication channel of choice as well. With regard to email, the results could be split into several categories, as in table 5.

Reason for preference	Responses
Asynchronous, non-intrusive	30
Future reference	16
Time to give good responses	6
Other	6

Table 5. Why do you prefer email?

Most of the respondents answered listed that the non-intrusive nature of email was what made it their favorite way of communicating: *«It is not intrusive, people can answer whenever they have time»* (Survey). The second group of answers valued how email would function as a record of what was done or said. Its function as a paperless paper-trail seemed to be favored by many: *«I prefer to have answers in writing so that I have the possibility to go back and refer to it later.»* (Survey) A third category expressed appreciation of how email gave the respondents time to think before responding: *«Give the person I am contacting time to think and give a good answer»* (Survey).

Based on these data, the surveyed staff at the Oslo office preferring to use email, do so because email is *asynchronous*, *non-intrusive*, and it gives you *time to think about your responses* and maintains a *history record* of the conversations. When looking at the social affordances of email in comparison, it a clear correlation. Wellman's three top-level affordances were *focus*, *privacy and control* and *speed and ease*. (Wellman 1999). By holding these up to the responses, it looks like a one-to-one correlation:

Opera employees	Wellman
Asynchronous, non-intrusive	Speed and ease
Future reference	Privacy and control

Opera employees	Wellman
Time to give good responses	Focus

Table 6. The social affordances of email.

While there seems to be some overlap between the categories *focus* and *speed and ease*, and a failure to mention the privacy aspect by the Opera employees, it seems as if Wellman's list of affordances also apply to the Opera employees. This says something about their usage patterns, and it does not deviate too much from what Wellman expects from other people.

Email Alternatives

While most at Opera prefer email for communication, as previously presented in the survey, there are others who do not. During my interviews, I encountered what seemed like a deviant case. My interviewee did not consider himself an email person: *«Personally, for me, I am actually not really much of an email person. I mean, I normally reply to emails, but I am not too much into emails as in a form of communication»* (Interview #2). Last time I checked, my interviewee was still employed by Opera, which means that even in this email-heavy organization there is room for those who do not consider themselves to be *email persons*.

Internet Relay Chat (IRC)

A mixture between email and instant messaging; IRC facilitates conversations between several users in virtual chat rooms, or peer-to-peer conversations. Just like email, it is asynchronous, and while it is possible to create history records, called *logs*, of IRC conversations, the logs are commonly not as elaborate or well-organized as the thread structure in email clients. IRC is the second most popular way of communicating at Opera.

Reason for preference	Responses
Quick	16
Less formal	4
Services	2
Other	3

Table 7. Why do you prefer IRC?

The main reason for choosing IRC is that it allows instant responses, while still remaining asynchronous. Or, as one of the respondents put it: *«It is more "live" than email, but still not as bothering as a ringing phone»* (Survey). Some also prefer IRC for its informal nature, or because

of the services that can be built on top of it.

Skype

Internet telephony is often associated with Skype, which provides computer to computer calls and chats free of charge. The company makes its revenue from prepaid conversations. Skype is widely used at Opera, and approximately one fourth of the respondents labeled Skype as their favorite way of communicating. Some of the features are similar to those found in IRC, but Skype has the added bonus of supporting voice calls.

> «It is more informal and spontaneous than mail, fairly widespread, allows for easy exchange of files and can be used for group meetings. IRC is a close second. Phones are rude.»

One of the respondents states that «I do not, everybody else uses it». In other words - the respondent does not prefer using Skype, but because those he needs to communicate with use it, there is little room for choice. There were not enough responses as to why Skype was popular to support categorization.

Other Instant Messengers

Favored by few, this category covers IM clients such as MSN Messenger and Google Talk, but also the more «technical» clients such as front-ends for the Jabber protocol. Most of those who favored an IM client did so because of the speed: *«Quick and easy, a direct channel with no noise»* (Survey).

Phone

The now «old» conventional phone is still favored by some, but at Opera Software only by a clear minority.

> «If there is an important dialog I call to emphasize the importance. [...] I receive 70 - 120 mails a day. Due to the amount it is difficult see the really important one.» (From the survey)

The largest surprise is perhaps having IRC as the second choice. Opera might be a special case in this regard, due to the Opera Browser having integrated both email and IRC. Therefore the jump to IRC may be a much smaller leap, as it can all be done without even launching a new application. Skype is also vastly more popular than using the *legacy* phone, which may be seen as somewhat surprising. I see this as an expression of technological culture, where computerized solutions are preferred to their analog counterparts.

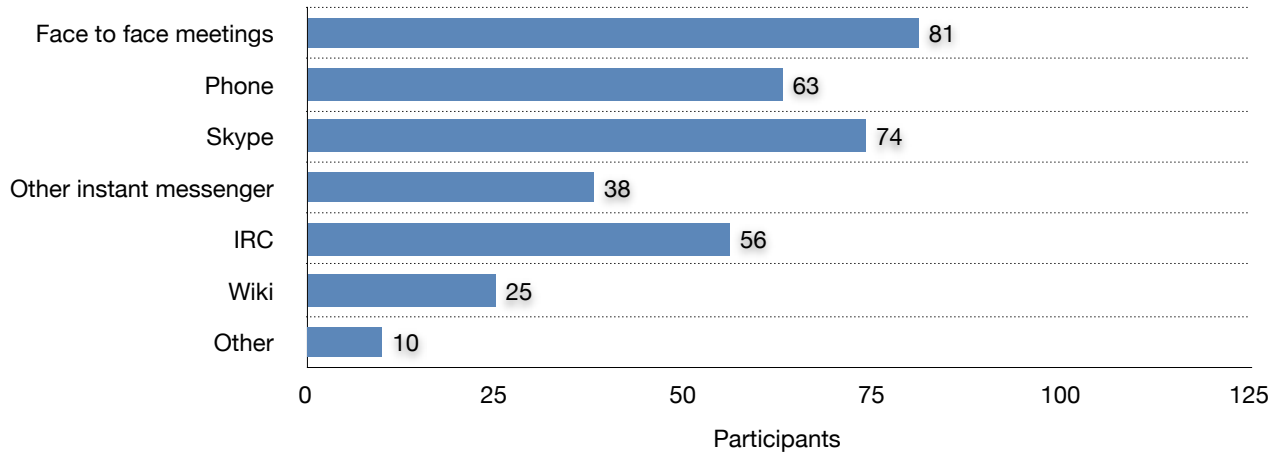

Figure 23. Which communication channels do you replace by email?

Face-to-face meetings as well as Skype and phone calls are most frequently replaced by email. This is somewhat surprising, given the difference between face-to-face interaction and email. Perhaps it would be more natural to replace Wiki usage with email, given that they are fairly equal in media richness.

> «[...] you get those who are very active, and then you have those that have simply switched it off, and do not participate in those lists» (Interview #1, my translation)»

A recurring sentiment throughout the answers to these questions are responses indicating other values than simply the usefulness of the communication channel dictates its choice. One example of this is the participant below, stating his or her preference for the «Jabber» instant messaging protocol:

> «Jabber is an open protocol that allows everyone to choose a client to their liking without forcing the same choice upon others.» (Survey)

Another reason for choosing software amongst developers is if they can get access to its data easily, such as a text log from IRC. Especially interesting is that the participant indicates how the culture of a software matters when the choice is made. This could be a reference to the culture of the developers around the software.

> «I have used IRC for half my life, it is instant, does not require any software I have not chosen myself, and does not require me to add people to some list. It is also logged in a format of my choosing, allowing it to be searchable. It has a familiar interface that is easy to use for me, and I appreciate its culture.» (Survey)

Based on this, it is necessary to keep in mind that there are other factors than purely suitability influencing the choice of software for a given task - perhaps even more so for the technologically

skilled employees.

Chapter 6

Strategies For Managing Volume

Now that we know not only of the overarching mechanics driving email volume, but also the local practices contributing to this effect, a new question arises. What strategies do they employ to deal with the large amount of email volume, without this consuming the better part of their workday? In this chapter I will examine their email habits, and discover what practices they employ to tackle their inboxes.

Living In Their Inboxes

When working at Opera, email is not something you check once a day. It is checked often, some would even say constantly. Email constitutes the organizations' nervous system, and to stay updated, it is constantly polled for new information. Email is expected to be a high-speed communication channel. When sending one, the expectation is that it will be received and read shortly.

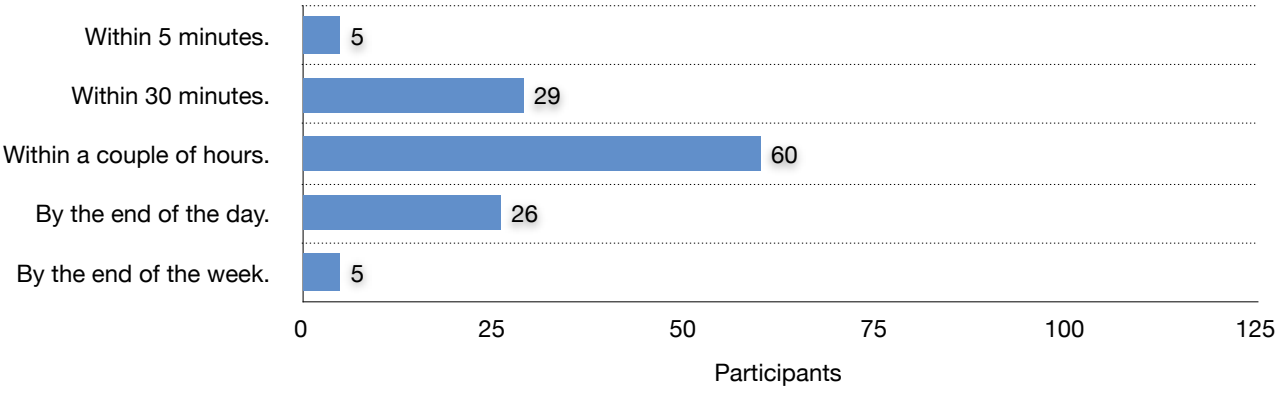

Figure 24. When you send an email do a colleague, you expect it to be read...

Most participants expect their emails to be read within a couple of hours, while others within 30 minutes. As most work at Opera is carried out in front of a computer, the email client is readily available at all times. As will be discussed shortly, there is a clear difference in the treatment of

direct and list email. I should have specified what type of email this question was pertaining to, but I intended to have it describe *direct email*.

In order to read new email, the inbox needs to be checked. I asked the participants in the study how often they check for new email, and they tend to check often:

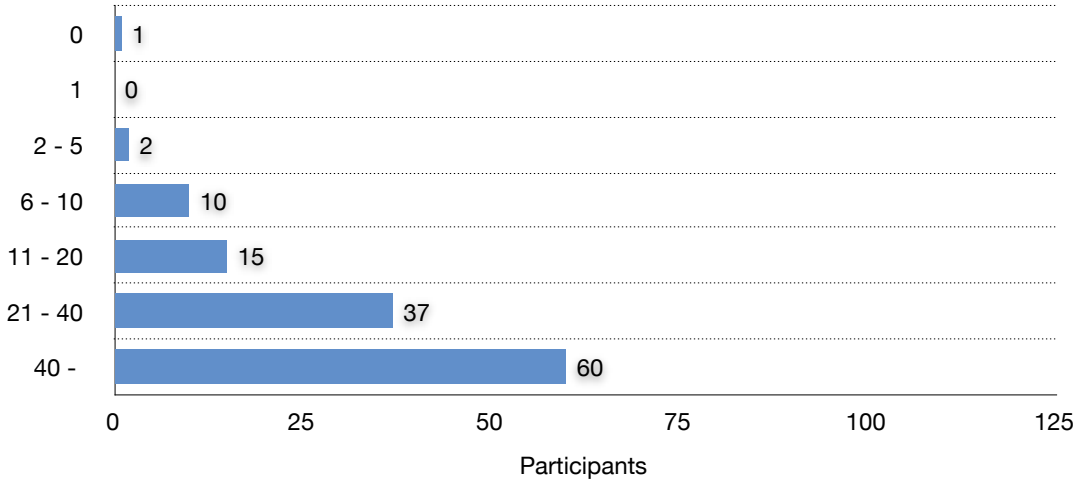

Figure 25. How often do you check your inbox?

The majority claims to be checking their inbox more than 40 times a day. By looking at Figure 25, we find by checking 40 times a day they would check their inboxes more than five times an hour, which enables them to respond to an email within 30 minutes with time to spare. After conducting the survey, several participants approached me and said that they were notified instantly upon receiving new email. Furthermore, they did not check their email inboxes, having configured the email client to poll the server every other minute. When the email client encountered new email, it would pop up a notification, and the participants would proceed to read the new email message immediately. It is impossible to know how many of those who stated that they checked *more than 40* times per day used such a notification scheme, but as the functionality is built into most email clients, this scheme is likely to be used by the Opera employees.

When checking that frequently, why are not all email responses instantaneous? The primary reason is that the constant interruptions would slow down the workflow. Email is no longer like *legacy mail* delivered once a day, it is more akin to water flowing down the river. The sheer amount makes it hard to keep an eye on the constantly incoming stream. Expecting quick replies, it is a challenge to set up an email checking regime on your own, without clashing with the coworkers' expectations. One of my interviewees expressed frustration with the short deadlines:

> «There is an expectation of responses to sent emails which is very short. I have been bugged about emails arriving the day before, not for a response, but in the form of «we need this, why is it not done yet». And the email arrived 15 on a Thursday and the

> follow-up came 11 on Friday, so there are very tight deadlines on both reading and acting on it.» (Interview #10, my translation)

Not responding on time can be seen as rude. An interviewee who received a substantial amount of email, clearly felt offended by some of his coworkers being slow responders. He attributes this to the fact that *they do not like email.*

> «[...in] this company, unlike any other I have ever been, people do not like mail. They either ignore it, or they do not think it necessary to reply, or if they do, they do it very late. So it is a problem». (Interview #8)

As will be will be seen later, this is not the case, as the Opera employees are generally very fond of email. The righteous indignation expressed is also an expression of violations of the email Code of Conduct. However, the common case when someone fails to read your email on time, is to follow them up, asking for them to respond: *«But it happens quite regularly that you ask in the cantina or in their office, if they had feedback to a request you sent them by email»* (Interview #3, my translation). This form of reminders is common.

Prioritizing Direct Email

Yet, there is one important distinction. It is between direct and non-direct email. Email addressed directly to the recipient gets priority over email sent to lists.

> «All mail which is to me personally, I read more or less immediately, without necessary responding straight away. The lists are often left alone, and then I do a sweep once in a while to see if there has happened anything important. But all personal email I read right away.» (Interview #3, my translation)

Answering an email while concentrating on development will negatively affect the quality of the email. Similarly, by focusing on the email response, it will negatively impact the ability to code when switching back to development. Therefore, email processing is batched together as much as possible, with the exception being email sent directly to the recipient. However, this direct email constitutes a small amount of the overall volume:

> «How many do I read carefully? 10-20 max. That I really read. Yeah, max. Most of it- --the rest of it just keeping track. I skim through the mail and just- --since it is mailing lists, it is threaded and not so important to what I am doing now or that I will do in the next weeks- --months, so I just mark the thread as read and that is that.» (Interview #5)

One of the interviewees receives such a high number of directly addressed emails, that he has to prioritize them by sender importance:

> «When I get many emails, I need to decide which of the senders are important and who are not. I no longer go through my email in chronological order, because some of the emails are more important than others.» (Interview #10, my translation)

This is not very common however, and when asked, many blame their poorly configured filters if they feel overburdened with email:

> «The number is not too high, it is just the sorting that is an issue. But that is probably just because of the way I work.» (Interview #7)

> «As long as email is not addressed to me personally, and I know it is something important - or if someone asks me on IRC, in the cantina or something like that, there is no guarantee that I will thoroughly read the mailing lists» (Interview #3, my translation)

Based on my experience, the most common use of CC is when you have project-specific or team-specific mailing lists. Sending a CC to a mailing list that can be read by the entire organization is not done, especially not without direct or indirect consent of all those who have written the mail.

There Is Not Too Much Email, I Just Need Better Filters

Opera has a corporate policy of encouraging the use of its own email client; M2. During my interviews, there were some deviant cases, where the interviewees were using another mail client, typically «Mozilla Thunderbird». One was using a text-based console application, MUTT. Both Mozilla Thunderbird and Opera M2 are fairly similar in terms of capabilities, both offer POP3 and IMAP support, support for custom folders and filters. The use of certain email clients are discouraged, and Microsoft Outlook is formally prohibited by the company guidelines. Most email clients support the use of filters to sort email.

When receiving large amounts of email, sorting it correctly is paramount. Opera M2 has a feature which helps it to auto-categorize mailing lists. The way it works, it is possible to separate email from mailing lists from the email sent directly to a recipient. Several of the ones I interviewed stated that they used filters to manage their email. By utilizing the filter capabilities of their email client, they would have the computer help them sort their email.

> «[The increasing volume of email] has not become more of a problem for me, for me personally, because I do a lot of filtering. So most of the email I receive is not seen initially, until I get a chance later on.» (Interview #4)

By filtering in this way, a behavior is promoted where there is a clear distinction between email sent directly to someone, and email sent to a mailing list. Based on this, it is possible to create a set of checking patterns for email.

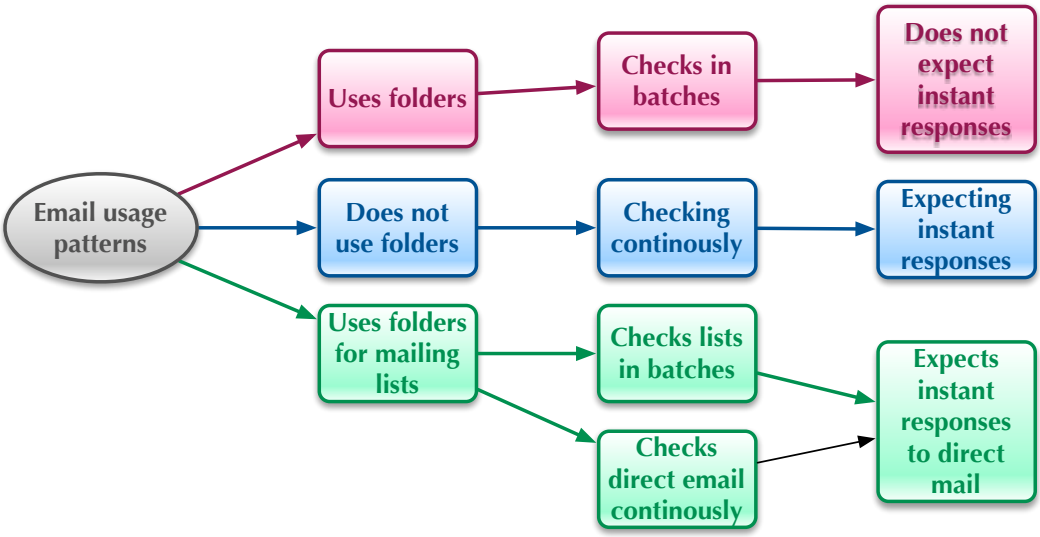

Figure 26. Email checking patterns.

By making a distinction between the email sent to lists, and the emails sent directly to someone, it is possible to employ two different schemes for checking email at the same time. However, the distinction is not as clear, as not all mailing lists are the same.

> «most [mailing lists] are filtered so I know what I need to look at. So if it is something important, maybe on [my team lists], I would normally look at it. If there are 100 mails in «nonsense», if I do not have time I do not have to go through that, since it is nonsense.» (Interview #2)

There is a hierarchy among mailing lists, and the *nonsense* mailing list is reported by many to be at the bottom of their priority chart. If there is time left when more important lists have been checked, then *nonsense* might get a time slot. By using these two broad categorizations, it is possible for the Opera employees to both respond quickly to direct responses, as well as keeping informed about activity on the mailing lists. This fits well with what (Hersh, 1982) found: *«Where there are discrepancies, users appear more willing to bend the use of the system, rather than their own behavior»* (Hersh, 1982). The users have adapted the system to fit their needs.

Old School - New School

One of the interviewees saw the email users in terms of two categories, which he branded them new school and old school. The category you belonged to, would be determined by your experience as an Internet user.

> «It feels as if there is an old school and new school. The developers who have worked with the Internet for a long time use it the same way as I do - the old school way. They put things into folders, and file away what they do not need. They sort their email, and keeps it organized.» (Interview #6, my translation)

The main characteristics of a new schooler would be that he deleted less email. He would also send out more emails, thus generating a higher volume and keeping a higher percentage. He would frequently use their email clients for document exchange as well, instead of placing them on a company server for the exchange.

> «Whereas the new school is [...] not deleting as much, and view their email [client] as an instant messenger. Much document exchange - just sending files to others temporarily, not for them to keep it. Just «look at this, edit, send back». Temporary email in a way.» (Interview #6, my translation)

In order to keep track of this immense volume, the new schoolers would not sort their emails into folders, but rather find what they wanted by using searches. In a way, the new schooler's inbox would be a database of information, whereas the old schooler would never search - he would know where his data was based on memory and good filing:

> «They [the new schoolers] pile everything up, and then find what they want with searches. [...] They use their inbox more as a database.» (Interview #6, my translation)

One of the other interviewees placed himself in the category of those who do not delete old email. He found value in keeping the history of his conversations:

> «[...] I use my email- --I have all my email for the last five years, as a nice archive, so I can go back through history and retrieve much information, which is very useful. I use it all the time. And to go one year back in time with email from a person and see what happened, what was said, and what plans were made.» (Interview #9, my translation)

Management of email is typically done through filters. One of my interviewees described two types of behavior in email management, and branded them the «new» and «old» way of handling email. The «new» way relied on retrieving email by searching your inbox, whereas the old way would involve grouping it into folders. From a user perspective, these methods may not be so different.

In many ways the difference between new and old school is the difference between knowing where to find something, and how to find something. The old school is better suited to a low-traffic environment, where it is feasible to place everything in its correct folder. With such a large volume of email currently flowing through the Opera mail servers, new employees will not be given the time to adapt their filters like the old-schoolers have had. That may also explain why they just leave all their mail in the inbox — micromanaging the mail with filters is a much more complex task than it was ten years ago.

~~Shared~~ No Responsibility

Another of the problems with mailing lists is the issue of responsibility. When emailing an

individual, that receiver is responsible for acting upon the contents. When emailing a group of recipients, no individual carries the responsibility of taking care of the request.

> «If it is to someone directly, then action will usually be taken. But if you send to a email list, it might end up in a black hole. It is not guaranteed that the one person you need input from actually reads the list that day. And then you get skeptical to sending something there in the first place.» (Interview #3, my translation)

Responsibility is not assigned, and therefore asking a list to «do something» is not common. It is more common to email in individual, and then CC relevant mailing lists to let them know the individual has been emailed.

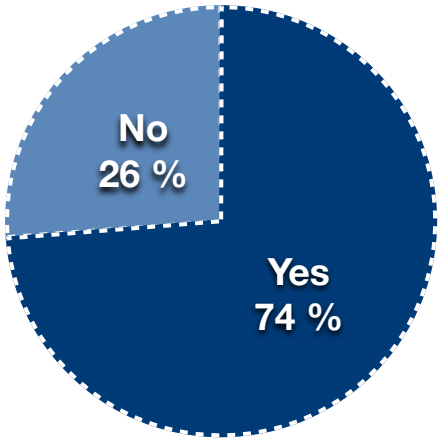

Figure 27. Should team lists be CC'ed on communication within a project?

When asked, most of the responders to the survey stated that team lists should be copied on communication within a project. This of course adds to the traffic on the lists, but keeping the members on top of things is seen as more important than it is to keep the volume down. For the company, the majority of the email is mailing list bulk mail. The practice of sending copies to mailing lists creates a feeling that what is there is less important than directly addressed email.

Cracking The Email Code Of Conduct

There are a number of unwritten rules regulating conduct in email conversations. The driving force behind the rules are perhaps the Netiquette guidelines, specified by the Internet Engineering Task Force (IETF) in RFC1855[19]. Most of the rules are applied much more strictly to public discussions. There are certain breaches of the RFC1855 which are sanctioned with more vigor than others. I have only included those that I find relevant to Opera, based on my experience and the statements of my interviewees.

19 http://tools.ietf.org/rfc/rfc1855.txt (read 11.05.2009)

Perhaps the most visible breach is when a *flame* is posted. The act of *flaming* someone is writing a directly hostile response. The feeling of anonymity combined with an audience, seems to promote activity otherwise regulated by social norms. When a participant decides to post an inflammatory message, the result is often that the entire thread explodes into a *flamewar*. While this is not desirable on the Internet as a whole, it is particularly unwanted in a company such as Opera. In order to avoid igniting these flames, one should avoid posting deliberately provocative messages known as *flame-baits*.

> «First of all, there are several rules enforced. That we do not allow, bad, infectious and dangerous programs. That is the number one rule which nobody is expected to break. And if he or she does, punishment immediately follows. Do not expose the company to risks, to known risk. Which is [why] a set software is forbidden. That is how we handle email, we do not allow broken software.» (Interview #8)

Calling Microsoft Outlook «bad» or «dangerous» is a fairly courageous statement, given that this email client in 2005 was estimated to account for over half of the corporate market[20]. Yet at Opera it is forbidden to use, by order of the IT department. My experience was that this stance led to some satisfaction among the developers.

> «That [Microsoft Outlook] is one of the programs, but it is not the only one. We have security rules, we follow them. That is one. Number two is that we prefer plain text. So you are allowed to send HTML mail, as long as text fallback is provided. You are not allowed to send HTML-only mail because it will be automatically scrapped. So your message will arrive badly. That is for accessibility reasons, because [...] everybody should be allowed to read text. No matter their abilities. So we enforce plain text.» (Interview #8)

There are, in other words, two rules; the prohibition of certain email clients, and an expectation of emails sent as plain text, or at least supplying a plain-text fallback. For most of the recipients the wether the email is sent in Rich Text Format (RTF), Hypertext Markup Language (HTML) or plain text does not really matter, most email clients can display most content without trouble.

> « I am surprised of how little we see of expressions of different cultures, we see more different types of people. It is very clear who are developer types, oh, those provoked by top-posting and can go rambling high and low, and then there are emails back and forth about that, or if some new employee foolishly send an email with an attachment [to a list].» (Interview #1, my translation, corrected)

A third rule deals with the use attachments. When sending email with attachments to mailing lists, a copy of the attachment will be stored on the mail server for all those receiving the email, which is wasteful. Good practice is therefore to put the file on a company file server, and then provide a link

20 http://blogs.zdnet.com/ITFacts/?p=475 (read 13.05.2009)

to the file in an email. This avoids that the file is stored multiple times, thereby cluttering peoples inboxes and company server.

The fourth, and most popular offender, is probably «top posting». The «top» in top posting refers to writing your comments to the discussion above the other comments, instead of below. By doing this, it can be hard to see who wrote what. The desired way to post is using «bottom posting», placing the reply below the original email. Furthermore, quotations need to be marked. Therefore, the responder should indent each line in the original message with a «>». He can then write his comments after the entire original email, or weave his comments into the original email(inline comments). In addition, he should strip out signatures, greetings and so on from the original email.

Figure 28. Bottom and top posting

Placing the latest entry at the top instead of at the bottom is not inherently bad. However, top posting is usually combined with a failure to indent the original message and pre-fixing it with a «>», which can make the order of comments hard to see. The very worst case is similar to the case in Figure 28, in which there is a mix of top- and bottom posting.

The fifth mistake regards threading. Threaded emails carry an identifier to help the email client determine which emails belong together. It is one of the cornerstones of email conversations. Since most email clients do this automatically, there are only a few ways to get this wrong. The first way is not using the «reply» button in the email client, but rather creating an email from scratch, and sending it to the mailing list/recipients. It will then appear outside of the thread. Another way is to start a new thread by replying to a threaded message, which will cause it to appear far down in the thread hierarchy.

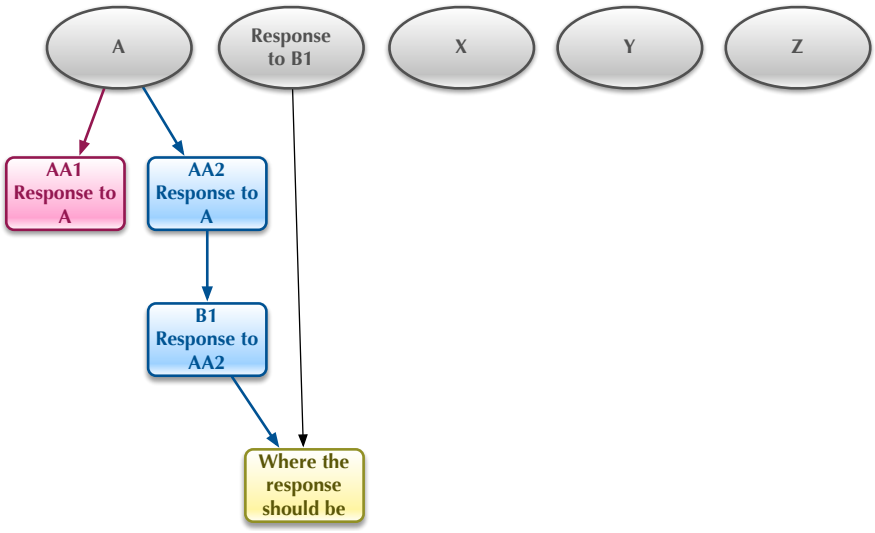

Figure 29. Failure to post in a thread.

A sixth way of making a mistake is by «hijacking» a thread. If we were discussing A, and you then changed the topic, it would be considered rude. It is considered even more rude if you do not change the subject line when changing the topic of the conversation. The proper way to do it would be «My topic (was: Previous topic)»

These six rules are not very complicated, but yet their existence is not well known outside of the developer communities. Therefore, this may cause tension between developers and non-developers, especially when a new person enters the email conversation by top-posting. Most developers are lenient about these rules when it comes to others, but as email lists often have many subscribers, it only takes one to sanction the wrongdoer in public.

> «And I must say I do notice, when an email is posted [to a list] with some mistakes in it, it does not take long before someone corrects it, often followed by a little discussion afterwards.» (Interview #9, my translation)

The mistakes are corrected, and the offender, while often surprised at the strong reaction, will think twice before breaking said rule again. One of the interviewees reasoned about the cause of this, and believes that the computer engineers have less focus on social niceties than other groups of people.

> «I think this has to do with the type of company we are in. Which is the geek company. And computer people - no offense intended - they are very focused, they do not think social niceties are of any importance. They have certain relations, certain flavors of autism, I think. They lack social skills, in a sense.» (Interview #8)

Chapter 7

Email Coordination In A Growing Organization

As Opera has enjoyed success in the marketplace, it has grown. As is shown in Figure 31, the number of employees has increased substantially. I have previously described, in Chapter 4, how this has led to a drastic increase in email volume. In this chapter I will examine the usefulness of email as a coordinating artifact. I will look at how well has it scaled, and examine what possible future scenarios may look like.

Is The Volume A Problem?

It is important to be aware of the different perspectives in this matter. What is considered too much email by some, is considered perfectly acceptable by others. To understand the general consensus of this matter, I asked this question in the questionnaire. The results were surprising, as visible in Figure 30:

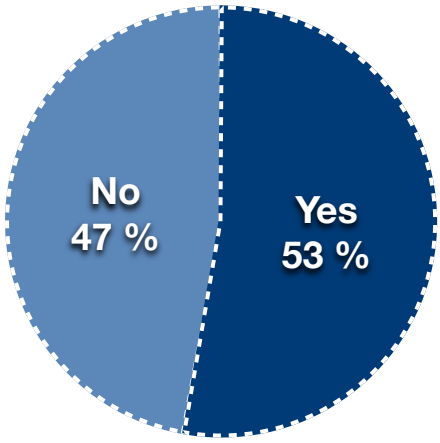

Figure 30. Do you receive too much email?

While I had expected a much larger percentage to answer *yes*, the number is still a cause for concern. When half of those asked state that they receive too much email, this needs to be examined closer. What I found is that what is considered to be too much email is a question of definition. One of my interviewees said he receives *«[...] anywhere between 300 and 800 emails a day»* (Interview #8), without seeing this as a problem. Upon asking if the volume of email is preventing employees from getting their job done, the most frequent response is that the amount does not represent a problem in their day-to-day work.

> «It is a bit of pain, and it takes some time that I think would be better spent actually accomplishing work, but it is not holding me back. I have not run into very many situations where something really bad happened because I missed an email or [...] I did not respond to something I should have.» (Interview 4)

There are others who see things differently, and view the amount as a problem. They feel like they are falling behind — losing track of their email, particularly because of the increase in the amount of it.

> «I think it is a problem. It is actually an escalating problem. Because the increase has been so rapid. I am starting to have issues keeping track of my own mail, tracking down old mail and such. So then I need to rely on search much more than I used to, and coming up with good search terms. But... it really is a problem, I feel I am always behind, there are always some emails — they just end up sitting in my inbox. And after staying there for a week, they are forgotten. (Interview 6, my translation)

For some, keeping up with the increasing volume is a problem. Those who are used to being able to clean up their inboxes, suddenly experience having to spend much more time to do so. This is similar to what Sidner and Whittaker (1996) found; when the volume increases, some previously *frequent filers*, would end up as *no-filers*, relying on search to find the emails they were looking for. As in the case of my interviewee, this is not necessarily a smooth transition.

Measuring organizational growth can be done by looking at the annual reports. I have reviewed Opera's annual reports from year 2000 to 2008, and found that the number of employees has increased substantially in this period.

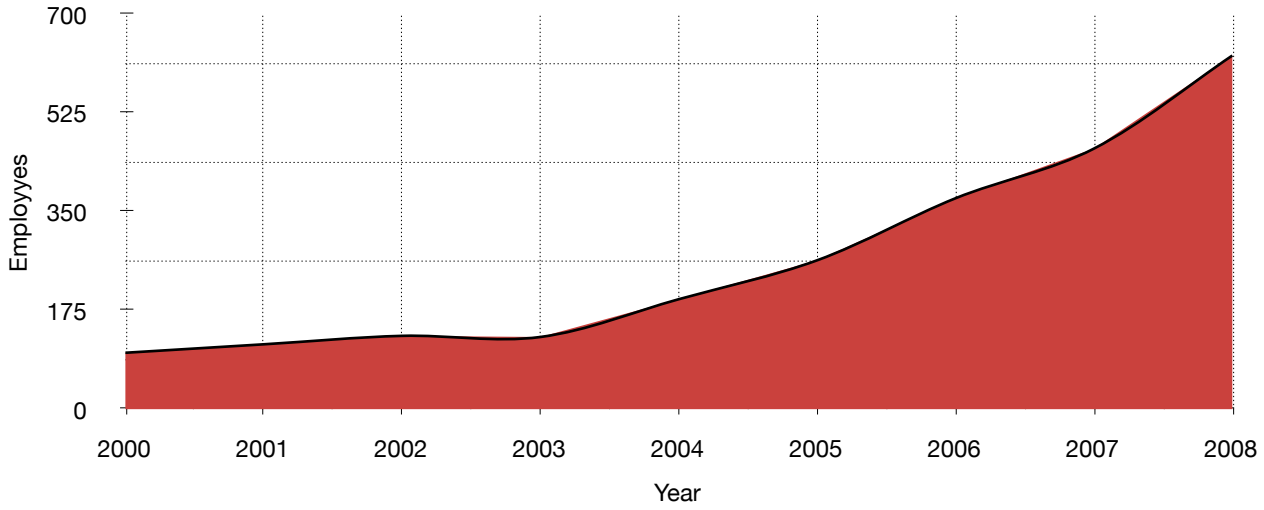

Figure 31. Number of employees at Opera Software from 2000 to 2008.

As described previously, as the number of employees expands, the need for communication practically explodes. This is unavoidable when using mutual adjustment as a coordinating mechanism (Mintzberg 1983). It is therefore reasonable to conclude that while the individuals in the organization are divided in their opinion on whether this is a problem for them or not, the organization at large cannot grow indefinitely without changing or impairing its coordinating mechanism.

The growth affects communication in another way as well. Failure to share information with a satellite office is a greater problem as the number in that office increases. Previously, it has not been as important to ensure that all were informed, but this is a growing concern.

> «[...] you cannot, as when we were smaller, say that «well well, they did not get that, they will just have to pay more attention in the future», now that there are many more [affected]» (Interview #1, my translation, corrected).

It is therefore not a policy to rely on the individuals to stay informed anymore, as it is seen as the company's responsibility.

Nonsense; Valuable

The unmoderated, company-wide email list *nonsense* has received a great deal of attention throughout this thesis. It is perhaps the greatest source of email for most employees. While some value it as an important communication channel, others dislike it for the vast amount of email it holds.

> «The «nonsense» list is a bit special. It has perhaps not changed all that much, but one striking change is that it has developed into- --in the beginning there was only nonsense there. After a while my impression is that is has changed into one of the most

> important communication- --informal communication channels in the company. But I am not sure everyone else sees it that way.» (Interview #6, my translation)

My interviewee is right in his assumptions in that everyone does not see it that way. In fact, it appears that some members of company management do not value the *nonsense* list highly.

> «There are some in top management who feel compelled to keep an eye on nonsense, because [...] it is a place where interesting things sometimes surface. Then after a while there is too much, and they ask themselves «How do these people have so much time to spend on this list?». » (Interview #1, my translation, corrected)

The value of «nonsense» is not immediately apparent, and the volume is cause for concern. A natural reasoning might be that the ones engaging in hefty debate on the «nonsense» list do so at the expense of more important tasks. This has not been my experience, as those who post the most on «nonsense» are often working more than expected of them; working nights or weekends when needed. This is confirmed by one of my interviewees: *«It is a mistake, because those participating on «nonsense» are not those who work the least, to put it like that»* (Interview #1, my translation). So if the people who read and write to *nonsense* are not there to waste time, then what are they doing? They keep up to date on relevant topics, discuss articles relevant to the company as well as company internal matters.

> «I think mostly everyone understands, you have probably felt it yourself, there are many more serious discussions there, regarding the company. Pulling in links, articles, blogs, other sources and starting a debate on the «nonsense» list. That is one of the reasons I still read «nonsense», that much of interest appear there. Things I did not know we were doing.»» (Interview #6, my translation)

So *nonsense* is where many Opera employees learn about the company they are in. According to my interviewees, however, as the traffic increases, more people unsubscribe.

> «There are too many [...] who unsubscribe from «nonsense». We have seen that for a long time. I think that is because of the immense amount of traffic there. It also is a cultural difference. Some feel- --see the value of it, whereas others view it as worthless.» (Interview #6, my translation)

The traffic is steadily increasing. Based on the statistics gathered, it is clear that that the volume of «nonsense» is still increasing.

Does It Scale?

When looking at email practices at Opera Software, it quickly becomes quite clear that most of them revolve around different ways of dealing with volume. It is important to note the distinction between the emails which individuals receive, and the volume which is transmitted through the organization as a whole. As the number of emails the individual receives increases by X, the

number transmitted and stored on company servers increase by X times the number of employees. The combination of a linear increase in the number of received emails per individual and a linear increase in the number of employees would thus result in an exponential growth in the number of emails.

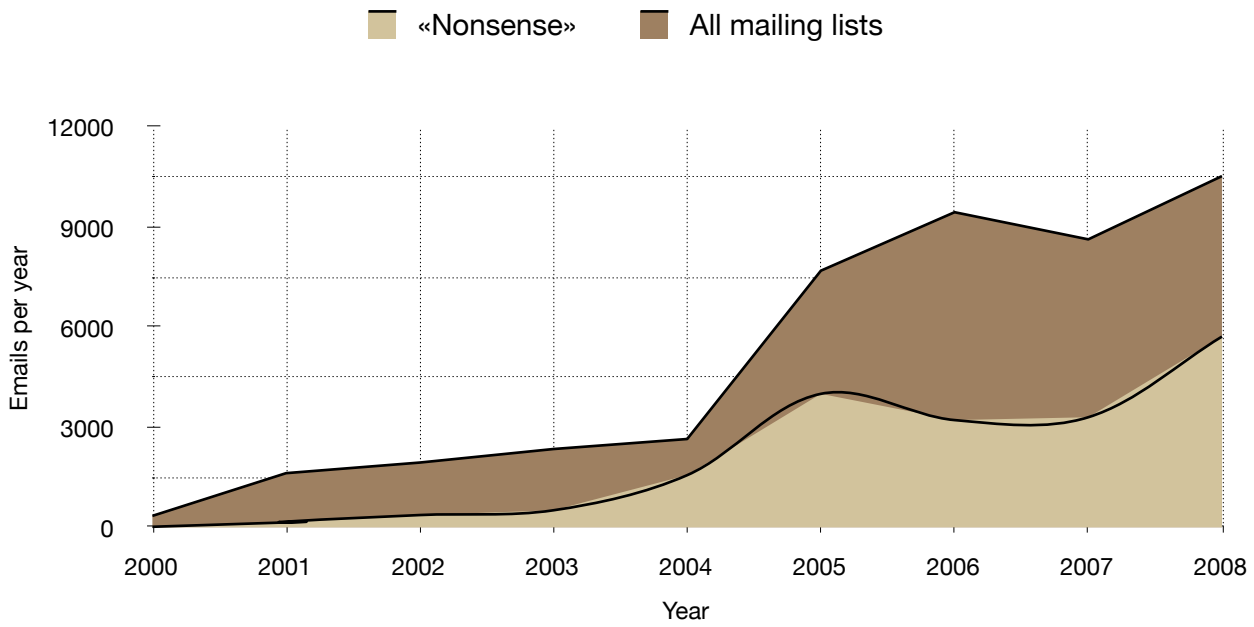

Figure 32. Emails sent to the «nonsense» list and to all lists

As the number of employees has increased (from 100 in year 2000, up to 627 by the end of 2008), it is to be expected that the amount of email grows as well. So it could be expected that the «nonsense» mailing list would have a little more than 500 % volume increase, to match the growth in the number of employees. However, the numbers reveal a much more drastic increase, from a total of 15 mails in 2000 to almost 6000 in 2008.

Furthermore, this is solely for one mailing list. It is shown in Figure 32 above; the total amount of email from lists increased even further. As *nonsense* grew in volume, other mailing lists were created to facilitate discussions elsewhere, limiting the traffic on the *nonsense* list. This is likely the cause of the temporary drop from 2005 to 2006. Not only did this act as a temporary speed bump; it also caused activity on other mailing lists to spike, making up for the drop in traffic on *nonsense*.

As can be seen by comparing figures 31 and 32, there is a distinct correlation between the number of employees and the traffic on internal mailing lists. However, the graph in Figure 32 does not reveal the complete story. I was unable to access data for all the project mailing lists, which according to one of the interviewees is becoming increasingly more common:

> «The informal, or social lists, have stagnated, or stabilized at a certain level. There cannot be much more on the nonsense-list, or people will start unsubscribing. One

> thing that has practically exploded are the project lists and other like then. [...] There were not many of those at first, but after a while I started getting very popular to create project-based lists» (Interview #6, my translation)

There total email volume is therefore likely to be higher, and is likely to have increased at a much higher rate as project lists have gained popularity. The project lists differ from the open-for-all or company-wide mailing lists in that the list subscribers are limited to those with a stake in the project. This effectively limits communication within the organization.

The simple solution would be eliminating the mailing list, and this has been considered and rejected. *Nonsense* is a list people turn to with their questions and comments, and this cannot be removed. At the same time, there is the increasing desire to decrease or at least stop the increase in the amount of email being received.

> «Of course I have been contacted with suggestions of just ending the «nonsense» [list], simply closing it. But no, we cannot do that. It serves as an important valve, and people need it. If we are to get the volume down [...] we need to offer a better alternative.» (Interview 1, my translation, corrected)

There is clear belief that by removing a too popular mailing list by force is not a viable solution. By not forcing a change, but rather providing a superior solution, it is believed that eventually there will be a shift from using mailing lists towards using forums.

> «Yes, my goal is that we modify our intranet, by creating a forum there. To decrease the volume and provide historical reference perhaps. You can go back in a thread, find all kinds of things. There are a great deal of advantages to using a forum, so it is our plan with regards to the various lists.» (Interview 1, my translation, corrected)

The forum solution was not implemented when I left Opera in the spring of 2009.

Exploring The Limits Of Email Coordination

Earlier I examined how the project mailing lists may have taken over traffic that would otherwise have ended up on the company-wide mailing lists. To illustrate this point, I build upon Palme's (1995) formula; but assume that the need for new threads depends on the number of group members, by multiplying the group member number by itself. The formula used is *Employees x 0.05 x Employees^2*, and the resulting graph looks like the one in Figure 33:

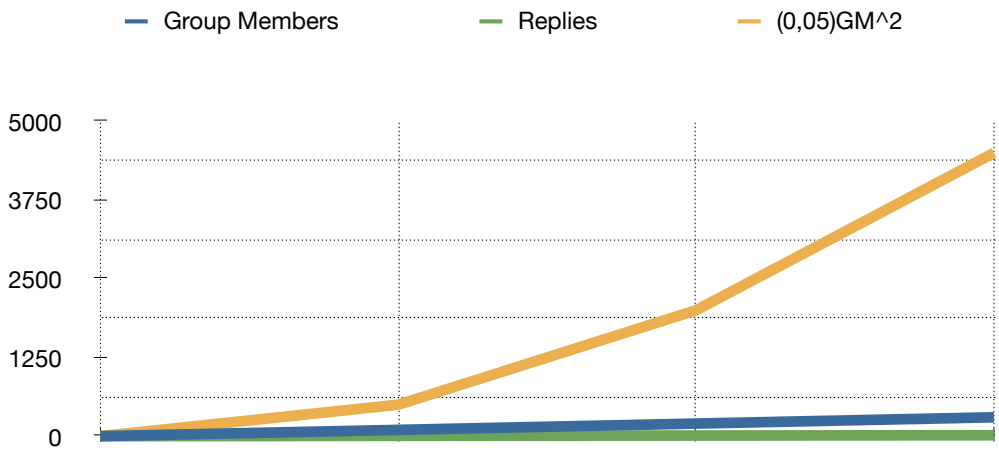

Figure 33. Exponential increase in emails.

How reasonable is it thus to assume that such a relationship exists? The result leaves several open questions. Palme (1995) does not specify whether this is the overall amount of mail sent, or per mailing list. Neither does he specify an interval between measurements. Most likely, Palme was not able to envision how email would be used in the future. Since all email users at Opera Software are subscribed to several mailing lists, the load is distributed. In addition, the social self-censorship is enforced. Most realize that their email will be read by hundreds of their colleagues, and therefore do not send it unless they deem it absolutely necessary.

More interestingly, the high result predicted by the formula could also be interpreted as a measure of the actual communication need in an expanding innovative organization. The gap between the number of emails sent and the number given by Palme's (1995) equation could be seen as an indicator of how well the organizations' communication needs are served. I have gathered data on the *nonsense* mailing list, and by placing my modified version of Palme's critical mass formula beside the list, the following graph (Figure 34) emerges:

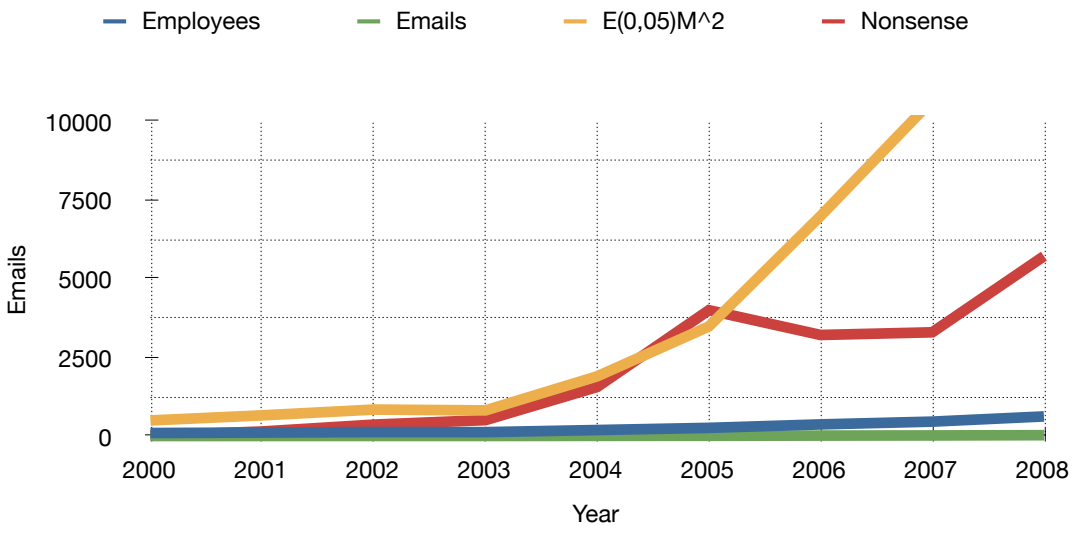

Figure 34. Exponential increase with data from «nonsense» overlaid.

Here we see the strong correlation between *nonsense* and these predictions, until 2006, when there is a somewhat surprising decline in the number of emails sent to the *nonsense* list. When digging deeper, I found that the reason for this decline is not a lack of interest in the mailing list, but rather a fragmentation of it. Because of the immense traffic on *nonsense*, new mailing lists were created to facilitate discussion elsewhere, on *opt-in* mailing lists. I was fortunate enough to get data for some of these lists as well, and when stacked on top of each other they look like this:

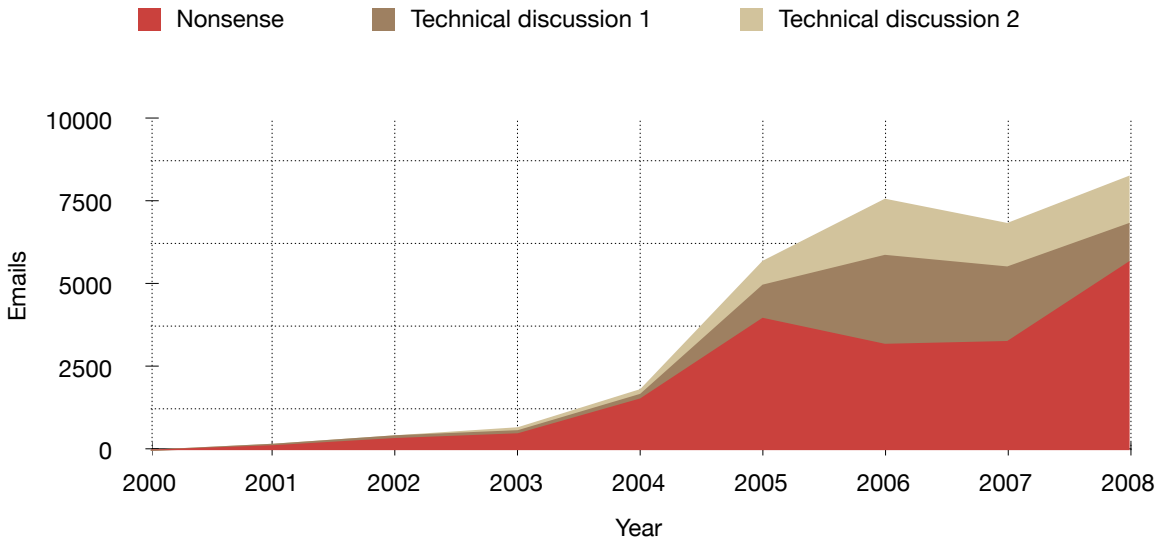

Figure 35. Nonsense get competition.

As is clear from Figure 35 above, when *nonsense* got competition, the decline in the use of the mailing list dropped slightly, but was more than made up for by the increase in use of other mailing lists. The move from *nonsense* was also only temporary, after a break of a couple of years the use of the list again went up. In addition, this was at a time when project lists started increasing in

popularity. While I do not have statistical data for these lists, there are several interviewees claiming that the lists carry substantial amounts of their email. I do not know whether it is a coincidence or not that this formula maps so well to the email volume growth. However, it would be interesting to map the real data for all of the email sent at Opera and see how that matched the formula.

Chapter 7

Conclusions

The journey through the Opera email practices has been a novel experience for me. I hope that through the data material, I have been able to shed some light on practices employed for email management at Opera Software. The most interesting findings are perhaps the description of the strategies for handling the large volume.

Opera fits the description offered by Mintzberg of the operating adhocracy. In power of their profession, the well trained employees are given autonomy in how to solve their tasks. In order to coordinate their work, they communicate extensively. Their chosen media for this task is email. As such, the employees at Opera have become email professionals.

By choosing email as the main communication channel, Opera has gained much of the flexibility envisioned in the *Network Organizations* (Palme 1995). Opera employees can thus easily email any other member of the organization. There are lively discussions on company-wide mailing lists, allowing project teams to spontaneously be created in order to undertake new projects. The success of email has resulted in other uses than peer-to-peer communication, as various internal systems use it for notifications.

To work effectively despite incoming email, the Opera employees have adapted different strategies. The most prominent of these is the clear distinction between direct email and email sent to mailing lists. The direct email acts as a priority channel, in which most of it is read quickly. Mailing lists, however, are not read every time there is a new response, but rather when the employee has time. As the mailing lists constitute the largest part of their incoming email, most employees are able to effectively deal with the email volume. As Opera has grown, the traffic on the mailing lists has increased in an explosive manner. At the end of 2005, there was a stabilization of volume in some of the company-wide mailing lists. This, however, does not tell the full story - as project lists became increasingly popular in the same period.

While it may seem as the email usage has stabilized, it may instead have shifted to another form. According to one of my sources at Opera, the number of project mailing lists has now passed 600. As not all of the employees are subscribed to these lists, the net result is that the communication is fragmented and segmented. A major challenge facing Opera at this time, is how to support effective innovation, while still being a successful and growing company.

Further research on this topic could be aiming to determine the tipping point; at exactly what level does the communication start fragmenting, and what are the consequences of crossing this point. It could also be interesting to compare Opera to other innovative organizations, to see if the Opera employees are alone in their preference of email and in that case what might be causing it. Another point of inquiry could be to dig deeper on the relationship between personality and organization-wide media choice.

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Appendix A

Interview Guide

The questions list topics to be covered - the interviews are to be open in nature.

1. Before we begin…
    1. Brief background of the interviewer
    2. Goal of the master thesis
    3. Informed consent
    4. Audio recording practicalities

2. Part one
    1. What is your position at Opera (Software)
    2. How long have you been with Opera
    3. In which department are you currently employed
    4. What is your background (former jobs / field of expertise)
    5. Have you had other positions at Opera

3. Part two
    1. Please give your views of how email is handled at Opera
    2. How has this changed while you have been with Opera
    3. How does the number of cultures present in Opera affect communication
    4. How many emails would you estimate you send / receive during a typical workday
    5. Do you consider the volume of email an issue in your day-to-day activities
    6. Have you experienced having to use alternative communication channels because email has not been read
    7. Is there something you would like to add

Appendix B

Online Survey

1. About you
    1. Which level in the organization do you belong to?
    2. How long have you worked at Opera Software?
    3. Have you signed a developer NDA?

2. Email usage
    1. How often do you check your inbox?
    2. While at work, do you check your email at…?
    3. Do you check your inbox in your spare time?
    4. When you send email to a colleague, you expect it to be read…?

3. Communication channels
    1. What is your preferred communication channel?
    2. Why do you prefer this method of communicating?
    3. Which communication channels do you occasionally replace by email?

4. Volume of email
    1. Do you receive too much email?
    2. How many emails do you receive on an average workday?
    3. Is the volume of emails that you receive increasing or decreasing?

5. Mailing lists
    1. How many mailing lists are you subscribed to?
    2. What percentage of your emails is from mailing lists?
    3. Have you not replied to mailing lists, because you did not want to «spam» so many recipients?
    4. Should mailing lists be CC'ed on communication within a project?